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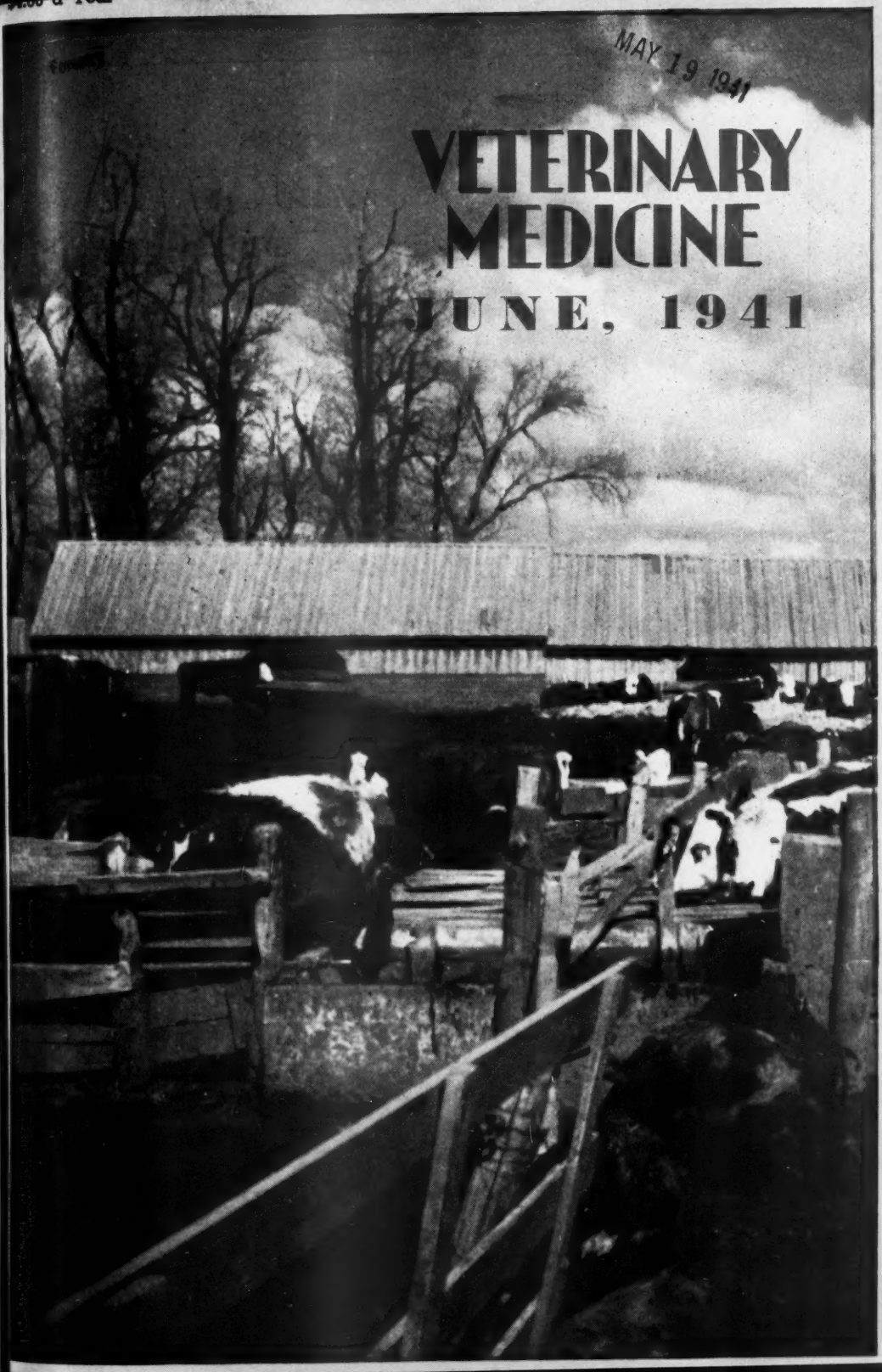
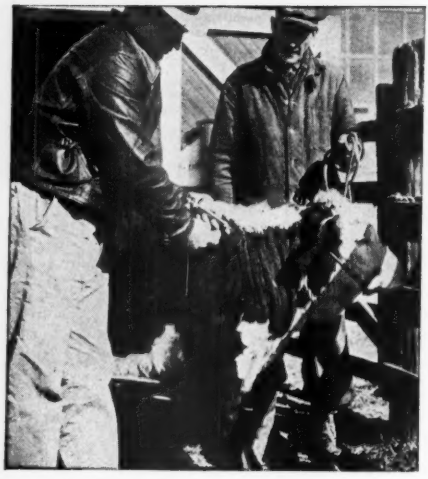
VETERINARY MEDICINE

JUNE, 1941





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THE FRONT COVER

This view shows a portion of the feedlots on the northwestern Iowa farm where the "salt treatment" for the prevention and cure of hemorrhagic dysentery and other forms of enteritis originated. A more insanitary environment could scarcely be arranged by careful planning. About 1200 swine are kept in the lots following feeder steers. Much of the time the mud and liquid manure reaches well above their hocks as the hogs wade after the cattle. No feeding floors are provided and their noses are usually buried to their eyes as they eat. Yet the animals return a profit to their owners; the loss from enteritis being practically nil. Most of the feeder pigs are purchased; some farrowed on the premises.

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It is the essence of science to be careful in the conclusion drawn from premises.

* * * *

An intradermal (allergic) pregnancy test, developed by Falls and associates of the University of Illinois College of Medicine, is attracting attention in medical circles. It consists in injecting a few drops of colostrum into the skin. A reddened areola appearing in an hour signifies non-pregnancy. No reaction denotes pregnancy. The test is said to be applicable as early as two weeks after conception. There is a possibility that it may be adaptable to veterinary use.

* * * *

The long-sought successful chemical treatment for human tuberculosis may come about as a result of research by veterinarians. Drs. William H. Feldman, H. C. Hinshaw, and H. E. Moses, of the Mayo Clinic, reported their results in treating guinea pigs infected with human tuberculosis germs with a new sulfa drug, promin, at the recent meeting of the American Association of Pathologists and Bacteriologists in New York. More than four-fifths of the guinea pigs treated with promin, before, at the same time as, or weeks after inoculation with tuberculosis germs, survived the infection for 189 days, with no gross signs of tuberculosis apparent in 60% of the promin-treated animals. All that survived had gained weight and were as alert and active as normal guinea pigs. All the untreated controls were dead of the infection at the end of the 189-day period. While this particular experiment may or may not have a bearing on human tuberculosis, it is a hopeful indication that eventually a chemotherapeutic agent may be found that will exert a favorable effect on human tuberculous infections.

Since 1924 there has been no case of botulism in man caused by factory-canned foods. Home canned foods have, however, caused from 10 to 20 outbreaks a year.

* * * *

John R. Mohler, Chief of the Bureau of Animal Industry, U. S. Department of Agriculture, delivered the Kober memorial lecture on March 28th under the auspices of Georgetown University. His subject was "Undulant Fever."

* * * *

Mueller (Roosevelt Hospital, New York City) reports the treatment of 75 consecutive cases of peritonitis following ruptured appendix and appendectomy without a fatality. Normally 20% of such cases die—16,000 deaths in 80,000 cases yearly in the United States. The treatment used was sulfanilamide applied locally. Other hospitals too have been using this treatment for peritonitis during the past few months, with the same spectacular results—reduction of mortality from 20% to practically, in several instances as at Roosevelt actually, zero.

* * * *

The American College of Surgeons arranged as one of its annual postgraduate courses a course in military medicine, given April 7 to 18 under the auspices of the Army Medical Corps, the Navy Medical Corps, and the U. S. Public Health Service. Instruction was afforded at the Walter Reed General Hospital, the U. S. Naval Hospital, and at the headquarters of the U. S. Public Health Service. Other medical schools, hospitals and medical associations have given, or are planning to give, shorter courses in military medicine as a contribution to national defense. The Albany Medical College, Albany, N. Y., is offering a course to senior medical students in aviation medicine.

Potatoes lose their ascorbic content rapidly during storage.

* * * *

We can eat 10,000 calories daily of perfectly good food and yet remain undernourished — even starved. One-fifth this amount will do if the materials are what we require.—*Irving S. Cutter, M. D.*

* * * *

Mellanby noted widespread nerve degeneration in young dogs fed on diets deficient in vitamin A and rich in cereals. Complete deafness was present in some of the animals

* * * *

Moore and Sykes of the Michigan station found increased cerebrospinal fluid pressure in young cattle fed upon vitamin A-deficient rations. This condition is accompanied by papilledema, nyctalopia, syncope and incoordination. On return to a normal diet, the cerebrospinal fluid pressure returns slowly to normal. The other disturbances disappear at the same rate.

* * * *

The common expression "wants it so bad it hurts" may be literally true of vitamins. Thiamin (B_1) when administered under certain conditions may afford more relief from pain than the most powerful narcotic; riboflavin has relieved completely eye distress in persons who could not endure the ordinary light of a living room, and nicotinic acid has changed the whole mental outlook of pellagrins, relieving thereby distressing hallucinations.

* * * *

Karn and Patton, University of Pittsburgh, report that rats fed a diet moderately deficient in vitamin B_1 suffered convulsive seizures and often became unconscious when a loud buzzer was sounded, but rats given a plentiful supply of B_1 were undisturbed. One hundred rats were used in the experiment, the object of which was to determine why soldiers "crack up" under artillery fire and dive bombing. Of course, it is well recognized among veterinarians that sudden loud sounds are prolific in setting off attacks of convulsions—fright disease—in dogs suffering from severe acute B_1 deficiency.

Graduate Instruction for Ontario Veterinarians

Last year the staff of the Ontario Department of Health conducted a course in public health work for veterinarians. The course was given at the Ontario Veterinary College and 65 veterinarians attended. The subjects upon which lectures were given comprised:

- Public Health Administration
- Principles of Sanitation
- Communicable Diseases
- Food-Borne Infections
- Interpretation of Laboratory Findings
- Bacteriology of Enteric-Infections
- Human Parasitic Infections
- Inspection of Water Supplies
- Inspection of Sewage Disposal
- Inspection of Restaurants and Bottling Plants
- Industrial Hazards in Meat Packing Industry
- Ventilation and Fumigation
- Dairy Sanitation

Later the faculty of the veterinary college conducted a short course in graduate work for practitioners. The subjects discussed included:

- Chemical Tests for Urinalysis
- Encephalomyelitis of Horses
- Plans for the Control of Bang's Disease
- Treatment and Control of Parasitic Diseases
- Modern Methods Employed in the Sanitary Control of Dairy Products
- Enteritis of Cats
- Kennel Management and the Control of Distemper
- Diseases of Swine
- Regional Anatomy for Intravenous Medication
- The Relationship of Faulty Nutrition to Disease

Veterinarians attending this course numbered 125.

* * * *

The American Society of Anesthetists has assembled over 200 cases of explosions occuring during anesthesia, including explosions caused by hot wire cautery, cutting diathermy knife, x-ray equipment, discharge of static charges with sparking, and pulling a plug connector from its socket while carrying current. There are probably other causes, but those mentioned indicate the more common ones, and serve to indicate the nature of reasonable precautions. —*J. A. M. A.*

FACULTY AND STAFF, SCHOOL OF VETERINARY MEDICINE, ALABAMA POLYTECHNIC INSTITUTE

Seated (left to right): Dr. R. S. Sugg, Dean and State Veterinarian; Edna Thompson, Secretary; Mrs. Bessie Emrick, Secretary; Mrs. Harold Nance, Librarian; Mildred Moore, Technician and Instructor in Bacteriology; Dr. W. E. Cotton, Lecturer and Consultant. Second row: Dr. E. S. Winters, Physiology; Dr. T. C. Fitzgerald, Anatomy; Dr. L. E. Starr, Pathology and Parasitology; Dr. B. T. Simms, Director of Regional Animal Disease Laboratory, Bureau of Animal Industry; Dr. F. P. Wolf, Surgery and Clinic; Dr. I. S. McAdory, Surgery and Clinic; Dr. D. C. Boughton, Protozoologist, Regional Laboratory; Dr. M. O. Robinson, Bacteriologist. Third row: C. O. Prickett, Student Assistant; George Boman, Scientific Aid, Regional Laboratory; H. W. Johnson, Veterinarian, Regional Laboratory; B. F. Cox, Bacteriologist, Regional Laboratory; Dr. Houston Odom, Therapeutics and Meat Inspection; Dr. J. E. Greene, Small Animal Medicine and Clinic. Dr. D. A. Porter, Parasitologist, and George F. Couthen, Scientific Aid, Regional Laboratory, were not present when the picture was taken.

Man's Lengthening Life Span

In the sixteenth century the average length of life in western Europe is said to have been 19 years; in the seventeenth century, 25 years; in the eighteenth century, 32 years. In the nineteenth century in this country life averaged approximately 40 years; at the beginning of the present century this average had increased to 49 years, and by the end of the first quarter of the twentieth century to approximately 57 years for boys and to approximately 60 years for girls. By 1938 this increase in life expectancy at birth in the United States had extended to 62 years for males and females combined. Splendid as this is, it is still four years short of the present life expectance in New Zealand.—*Harold S. Diehl*, in *Healthful Living*.

Three Horsemen

A letter printed in the *Chicago Tribune* recently is interesting for the memories it will revive among those who were practicing veterinary medicine two score years ago. In part it reads:

When Chicago was young my duties as a horseman brought me in close contact with the grand old families that lived along the gold coast of Chicago's south side half a century or more ago. There never was an automobile built that cost as much money as did some of the coaches and other vehicles in use then and a set of gold mounted harness often cost a thousand dollars or more. I know of many a pair of good coach or hackney horses that sold for from 10 to 20 thousand dollars. I've been associated with horses all my life and in my estimation the grandest figures I ever beheld mounted were those of William F. Cody [Buffalo Bill]; Mayor Carter H. Harrison, and Captain Bullwinkle.

Dairy Industry "Threatened"

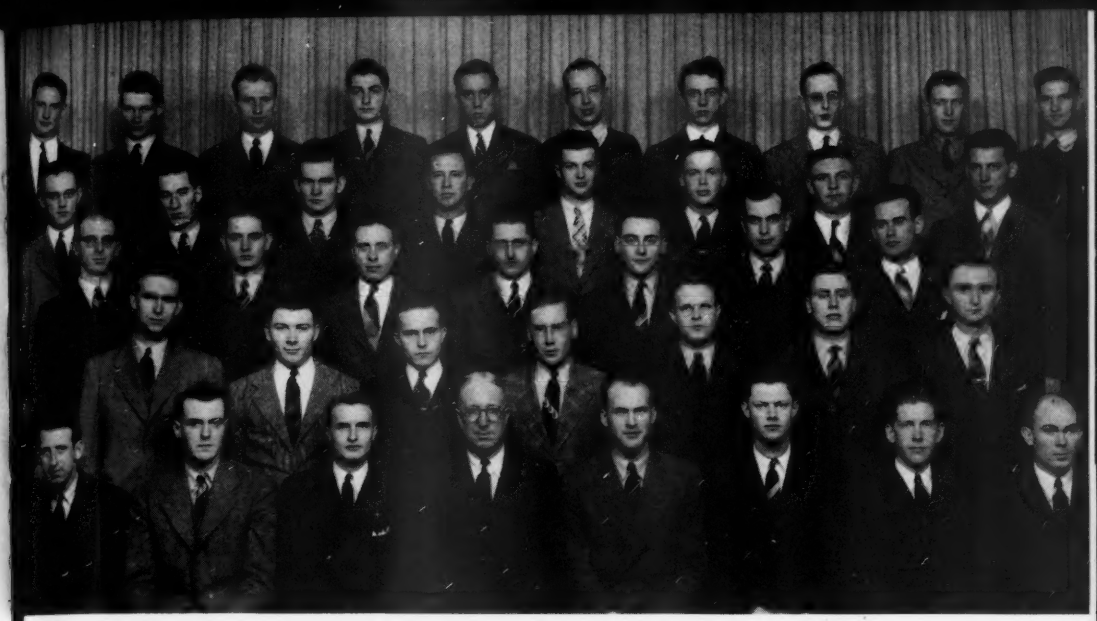
The margarine industry has initiated a movement in the Congress to repeal the law providing for a retail dealers' tax for the sale of margarine. Under the present law, retailers of uncolored margarine are required to pay a license fee of six dollars per year and of colored margarine $48.00. The industry's chief objection to the law is the limitation it places on sales outlets in consequence of the inconvenience of obtaining a license, keeping records and filing reports; thus in 1940 there were but 162,720 retailers of margarine out of a possible 600,000. In addition to the retailers' license fee there is a federal manufacturers' tax on margarine and in some states an import tax also. The pending measures (two have been introduced in the Congress) do not affect these latter taxes.

Dairy and creamery interests vigorously oppose the pending legislation on the ground that all sales of margarine are at the expense of creamery butter sales. However, the matter is not as simple as that. There is much doubt that restrictions on the sale of margarine have ever helped the dairy industry at all. On the contrary they may have indirectly harmed it. The margarine taxes may have set back the development of the dairy industry for a generation. They have enabled it to dispose of a large quantity of lowgrade products—indeed, of an enormous output of dirty, unwholesome, unpalatable products unfit for human food, or in the language of the federal courts, "consisting in whole or in part of a filthy, decomposed, and putrid animal substance."

Experience has shown repeatedly that it is extremely difficult (practically it has been impossible) to improve materially the product of a widely diversified industry so long as a ready market is provided for inferior products of that industry. Only recently this has been strikingly exemplified in the poultry industry of the midwest, where despite an energetic educational program it has been shown that 15% of its meat products now marketed is diseased or otherwise unfit for human food.

Restrictions on the sale of margarine long have been at least in part responsible for providing an ample market for inferior dairy products that do the dairy industry an incomputable harm. The popularity and use of dairy products, being food particularly for infants, children, invalids, and the less vigorous, is strikingly influenced by its palatability and the confidence the public has in its cleanliness and wholesomeness. For example, it has been shown that in a community having an inferior fluid milk supply the consumption of fluid milk can be increased 100% in little more than a year by supplying a high-class product and winning the confidence of the physicians and housekeepers in its purity and wholesomeness. In the past decade the average quality of market milk has improved and its consumption has increased nearly a billion gallons a year. In the same period, the consumption of butter has decreased.

Scientific research has shown that dairy products, produced as they should be produced, are superior in food value to their competitors. Common experience has shown that they are more palatable. When only clean, wholesome, palatable, high-class dairy products reach the general market and the public is convinced as to their purity, they will have no competitors except among the very low income class of consumers, where they could find little demand under any conditions. With such experience as is available upon which to base a prediction, it is not extravagant to say that were only clean, wholesome dairy products in which the public reposes confidence as to their purity available in the channels of trade the demand for them would exceed by a wide margin any conceivable capacity of the present dairy industry. High quality dairy products will solve the problem of what to do with the increased acreage of grass and other forage plants contemplated in the present land conservation program, and solve it to the profit of the entire dairy industry—breeder, producer, processor and distributor—and allied industries as well and at the same time improve the average nutrition and the health of the whole people. Incidentally, it will improve and increase dairy practice for veterinarians.



STAFF OF *THE VETERINARY STUDENT*

This group includes both the 1940-41 and the 1941-42 staff of *The Veterinary Student*, quarterly student publication of the Veterinary Division of Iowa State College. The old staff concluded its duties with the winter issue of the magazine, with the exception of the editor, who continues in office to help the new staff until next fall

Front Row (left to right): G. C. Lightcap; H. D. Ogden; A. M. Orum, Editor; Dr. G. R. Fowler, Faculty Adviser; M. L. Miner, retiring Business Manager; J. W. Carey; Raymond Helvig; M. W. Jones

Second Row: H. W. Dunne; H. P. Jensen; L. M. Forland; L. W. Feldman; L. A. Kanegis; S. C. Benbrook; S. C. Eittreim

Third Row: J. L. O'Harra; R. B. Price; Lew Llewellyn; L. H. Melles; W. L. Munson; J. C. McIntire; T. A. Sutherland

Fourth Row: H. P. Lortz; M. R. Flickinger; J. F. Welch; W. H. Timms; J. W. Hylton; E. S. McClelland; D. C. Van Howeling, Business Manager; W. L. Beer

Fifth Row: H. L. Marsh; D. W. Rawson; H. E. Jensen; L. E. Fisher; A. M. Scott; H. A. Grell; C. H. Mannasmith; C. J. Norden; H. H. Hoyt; H. E. Held

LeRoy Christensen, Editor-Elect, who will take office next fall, was not present when the picture was taken; Frank Bartley and Roy Kyner, two of the retiring staff, were also absent

---

H. R. 3871, introduced by Representative Burdick, North Dakota, provides that it shall be a misdemeanor for any person to experiment or operate in any manner whatever on any living dogs in the District of Columbia, for any purpose other than the healing or curing of the dog. Any person convicted of a violation of this prohibition will be subject to a fine of not less than $100 nor more than $500, or imprisonment for not less than three months nor more than one year, or both such fine and imprisonment. This bill is pending in the House Committee in the District of Columbia.

When a Dog Is a Nuisance

Dogs in themselves are not nuisances legally, but if they bark excessively or if the quarters are kept in insanitary condition so that the odor is offensive, they can be declared nuisances. Under these conditions the owner must stop the nuisance or dispose of the dog, or after proper trial, the dog may be put to death.

Local bodies of government such as towns and counties can, under the state law, determine how many dogs each person can own within their respective limits and can prohibit entirely the keeping of kennels.—*Will Judy.*

Vitamin B_1, King of Vitamins

To employ the often misused and overworked word "conscious," it can be said the public is supremely vitamin conscious, particularly vitamin B_1 conscious. Radio advertisers inform us of the unitage of this vitamin in our chewing gum and cough drops, not to mention practically all articles of food. At breakfast the labels on cereal packages confront us with the vitamin content. The staff of life is no longer a proper support unless it be B_1 bread or vitamin B "enriched" bread; and soups too must claim it. If a meat advertisement didn't state that meat is the richest edible source of B_1, the packers would suspect that there were fifth columnists in the advertising agency. In war-torn Europe daily consumption of the "morale" vitamin is required for both soldiers and bomb threatened civilians. No medical journal would be complete without a discussion of the value of B_1 as a treatment for delirium tremens, neuritis, and what have you.

Even the sports public has become vitamin-minded. When the New York Rangers lost a chance at the Stanley hockey cup a story attributed their failure to a vitamin deficiency. And doses of vitamin B_1 have been introduced into baseball players' daily diet—perhaps, the *Chicago Tribune* suggests, so that they will be able to take defeats in lighter heart.

Of course the swing to B_1 has gone to preposterous lengths, but the pendulum will swing back in time. In any case, the discovery of the practical usefulness of thiamin and others of the B group of vitamins was a great achievement. In this the veterinary profession was way out in front of the nutritionists and the medical profession. All the furor has developed within the year. The nutritionists have known of B_1 longer but did not realize its significance. It came into the consciousness of the medical profession and from them to the general public a full year after veterinarians were familiar with its wide application and the need for it in varied and unrelated conditions. A year before it was added to bread, breakfast cereals and other human food, the manufacturers of all the better dog foods were supplementing their products with vitamin B_1 concentrates. One such manufacturer alone is reported to have used 250 thousand pounds of a highly concentrated group B supplement last year.

Two years ago an article[1] revealing or implying all that is yet known of the importance of vitamin B_1 was published in this magazine. So striking was this discovery that it received the widest attention in the scientific, agricultural, and newspaper press accorded any scientific development in veterinary medicine up until that time, a publicity that has since been exceeded only by Doctor Mohler's announcement of the successful control of brucellosis in cattle by calfhood vaccination.

Throughout all the research that has been expended upon it in the past two years, thiamin has sustained its right to the title of "king of vitamins" given it by Doctor Patton, and to this date no one has offered a better explanation of its unique function than that proposed by him; that is, that it is necessary to carbohydrate metabolism *within* the cells and hence in greater or lesser degree to the proper function of any and all organs. If the function of the individual cells of which an organ is composed is deranged by B_1 deficiency, it follows that the whole organ must function improperly and that other vitamins, however much they may be needed, cannot completely relieve the deficiency until the deranged function of the cells is restored to normal. On the other hand, as Doctor Patton likewise pointed out, the administration of thiamin alone may ameliorate but cannot be expected to cure conditions in which a deficiency of other vitamins is also a factor. In his original article Doctor Patton thus rather accurately foreshadowed both the wide application and the possible misuse of vitamin B_1 therapy, predictions which have since received ample confirmation in both human and veterinary medicine.

[1] Patton, J. W., 1939. Fright disease an avitaminosis. *Vet. Med.* 34:6, pp. 372-381.

MERILLAT GOLDEN WEDDING ANNIVERSARY

Dr. and Mrs. L. A. Merillat celebrated their golden wedding anniversary March 27. A surprise party was held for them at the home of Maj. and Mrs. L. A. Merillat Jr., about one hundred friends attending. This photograph was taken just as the guests were gathering. Left to right: Mrs. T. A. Sigler, Greencastle, Ind.; Doctor Sigler; Mrs. George B. McKillip, Chicago; Mrs. R. A. Kelser, Washington, D. C.; Dr. George B. McKillip; Mrs. D. M. Campbell, Chicago; Mrs. W. A. Young, Chicago; Mrs. L. A. Merillat Jr., Chicago; Dr. W. A. Young (top of head only showing); Mrs. C. J. Spence, Clinton, Ia.; Dr. L. A. Merillat; Mrs. J. Wiley Lucas, Abingdon, Ill.; Maj. L. A. Merillat (without coat); Mrs. L. A. Merillat; Dr. C. J. Spence; Dr. J. Wiley Lucas, Miss Lois and Master Robert Young, Chicago; Col. R. A. Kelser; Dr. and Mrs. W. J. Embree, Columbus, Ohio

Some Horses and Mules React Unfavorably to Phenothiazine

Although phenothiazine has proved more efficient for removal of intestinal worms in horses and mules than any other known drug, poor, weak animals, and those affected with infectious anemia, are bad risks for the treatment, according to the federal Bureau of Animal Industry. Discovery of its efficiency, when given with the feed, has led to its use in nearly all parts of the country.

Thousands of horses and mules have been treated successfully with phenothiazine to remove palisade and other intestinal worms, but some reports of deaths or unfavorable reactions have reached the Bureau. Whether these have resulted directly from the drug, or from some condition previously existing in the animals, has not been determined.

Published evidence on the value of phenothiazine for removing internal parasites from horses does not show any deaths or injurious effects other than a temporary anemia and jaundiced appearance.

Treatment of any kind for removing intestinal parasites should be undertaken only when an examination of the droppings with a microscope, by a qualified veterinarian, shows it is warranted. In some cases, animals apparently in good condition have suffered from use of the drug.

Wholesale treatment should be avoided. When large numbers of horses are to be treated with phenothiazine, one or two—the least valuable of the lot—should be treated first to determine whether they tolerate the drug, the observation period being about a week. If results are unfavorable, no other horses or mules should be treated. If no bad results are observed, the remaining animals should be treated a few at a time, and the observations repeated. This procedure should be followed until the entire group has been treated.

In all instances the diagnosis of parasitism should be made, and the treatment given by a qualified veterinarian.—*U. S. Dept. of Agr. Press Release.*

Iowa Experiment in Disease Control—I.

When Iowa research in animal disease is mentioned all readers of course think of the splendid research institute operated in conjunction with the Veterinary Division of the Iowa State College at Ames, and expect to hear of yet another scientific achievement of Murray or Biester or Schwarte or McNutt or others whose research has been so productive of recent years.

But this experiment in animal disease control (or rather, these experiments, for there were two of them although only one will be discussed at this time) has nothing to do with the Veterinary Research Institute. This was an experiment in the control of poultry diseases, and was carried out on a grander and more costly scale than any experiment of which Murray or Biester ever dreamed. It came about thus.

■ Partly because of its favorable geographic location and climate but chiefly because of the abundant feed produced on its unrivaled farms, Iowa in the past quarter century has come to be the leading state in the production of eggs and poultry meat. That sounds like considerable of an achievement; but, sad to relate, this vast industry on the whole is unprofitable. Were the feed consumed computed at market price and a pittance allowed for the labor expended, the final entry on the books of most producers must be in red ink. The cause is the usual one when animal husbandry fails to reward the husbandman—loss from disease.

Twenty-five years ago the death loss in Iowa poultry flocks, it is stated officially, was 5% per year. Now, according to the same source of information, it is 35%. An increase of 600%! It doesn't take an economist to deduce that a business that loses 35% of its operating capital yearly cannot be profitable. Iowa is not only first in the amount of poultry and eggs produced, but first also in the percentage of tuberculosis in its flocks and in the amount of diseased and unfit poultry marketed (official figures again).

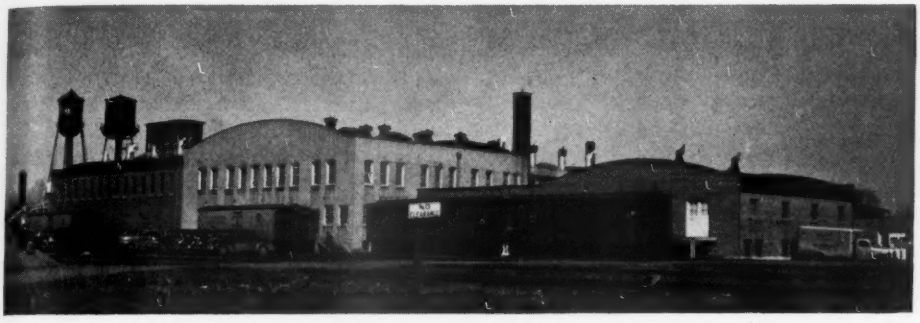
When the Iowa poultry industry began its rapid extension about 25 years ago and poultry disease an even more rapid increase, veterinary advice was not sought in the matter of disease control. Its leaders had other plans—and so the experiment began; an experiment in animal disease control without a trained personnel. Iowa became a Mecca for the pill peddler and for the hatcheryman who distributed more dope than baby chicks. Those were halcyon days for all manner of poultry disease fakers, and they have continued right down to now.

■ But as the industry grew and the disease incidence multiplied, the conviction developed that Iowa should have something different from the common poultry quacks that less important poultry producing states had. Iowa should have something special—and it got it. A two-week "school" for poultry doctors sprang up. It thrived better even than the poultry diseases. Fifty—a hundred—a thousand—three thousand 10-day poultry "doctors" were soon graduated at $50 per; and if they were unable to learn any pathology or therapy or how to differentiate diseases in that period, they were able to learn the prices of the remedies manufactured on other floors of the school building and the more effective of the sales arguments. This brought the old-fashioned, uneducated poultry quacks a competition that threatened their existence; but poultry disease, like Tennyson's brook, went merrily on and on, and the increase saved most of them from the relief rolls. And that is Iowa's multi-million dollar experiment in the control of disease without a personnel learned in the vagaries of disease in charge of control measures.

The findings include a sevenfold multiplication of the loss from disease; 65% of the poultry flocks now infected with avian tuberculosis, and Iowa poultry barred from its principal markets because of unfitness for human food. *Res ipsa loquitur,* as the lawyers say—the thing speaks for itself.

■ The experiment is finished, but the mess, like the melody, lingers on. It happens that New York City is the principal market for

Iowa dressed poultry (which in poultry lingo means dead but uneviscerated birds) and Chicago for live poultry. As long as four years ago the health department of New York City began admonishing Iowa poultry shippers to desist from sending so much diseased and otherwise unfit poultry to the New York market. The abuses increased and last June the department formally notified the New York poultry brokers, the Iowa shippers, the Iowa Department of Agriculture (whose responsibility it is to see that no unfit food products reach the channels of trade) and the Iowa poultry industry, that a large portion of Iowa poultry received at New York City was diseased, heavily parasitized, emaciated, bruised, or otherwise unfit for human food, and that unless the shipment of such poultry was discontinued, the sale of all Iowa poultry within the city would be prohibited.



An Iowa Poultry Packing Plant

Here was a situation that really called for action, and it came swiftly from all sides. The poultry dealers assembled in convention and memorialized the New York health department, affirming their own unimpeachable characters, their tender solicitude for the health of New York consumers of poultry, their irrevocable decision never to send them another pound of unfit poultry, no matter how strong the temptation. The state department of agriculture outdid even the dealers in sublime promises. The Extension Division of the State College energized its somewhat desultory educational program and sent speakers to address meetings of poultry producers hither and yon, telling how to detect, prevent and cure poultry diseases; and as always the pill peddlers hovered on the sidelines at such meetings, and their sales redoubled. Everybody was happy. Surely no health department had ever been promised so much. The dealers patted one another on the back; the department of agriculture patted the poultry producer on the back; and he, since the market for his sick birds and his culls was not interfered with, patted himself on the back and voted right. Conditions were near perfect. The health department had its promises and Iowa had its market. No one supposed the health department would be so unreasonable as to want performance in addition to promise.

■ Then in February of this year the New York City health department suddenly forbade the sale of Iowa poultry in the city and condemned and destroyed much of that in the hands of the dealers. Millions of pounds in transit went into storage. New York brokers frantically wired Iowa dealers to ship no more. Without a market the sick birds would die on the farms instead of going into the dressed poultry trade just before their last gasps. To make matters worse, the unfeeling health department turned evidence it had collected over to federal Food and Drug Administration officials and prosecutions followed for shipping diseased poultry in interstate commerce. There was no possible defense, and

fines up to $1,200 were assessed on pleas of guilty.

Entreaties to the New York Health Department succeeded promises, and soon the ban on first and second grade poultry was lifted, but it stands as to third grade and unclassified poultry. The first and second grade poultry in storage was released, but the third grade—20 million pounds of it belonging to Iowa shippers—still is quarantined. The Food and Drug Administration will not permit it to be sent across the state line without evisceration and veterinary inspection, which means a large part of it will be condemned and much evidence developed which would be usable in prosecutions. What a spot!

Of course, the first inclination was to truck to Chicago such of the diseased poultry as would live long enough to reach that market, but suddenly the Chief of the Food and Drug Administration of the Central District became interested. He was assured that the dying and emaciated birds were from Illinois farms and that interstate commerce was not involved. He was appeased for the time being, but remained skeptical; the dealers became fearful and the trade languished. There was one other hope—Iowa restauranteurs. Some of them willingly came to the rescue of the Iowa poultry producer—at a price, of course. But up spoke Iowa's chief food inspector Brownlee: "You can't sell diseased and unfit poultry refused in New York to Iowa consumers."

■ There is one organization connected with the poultry industry that may well say "I told you so." It is the American Institute of Poultry Industries, of which Dr. R. Fred Eagle was president until his death little more than a year ago. He and his successor, Mr. E. B. Heaton, have endeavored by every persuasion available to induce the dealers to cease putting diseased poultry on the market on the ground that it is not only unlawful but business suicide as well, since birds rotten with tuberculosis, or inedible for any reason, disgust consumers and decrease the demand for all poultry meat, including the first class article.

■ The foregoing is not the whole picture. It is only the most noticeable part of it—the stage show. Behind the scenes it is different and very much more agreeable. In the main it has been the small farm flock of from a few dozen to a few hundred birds that carried out the experiment referred to, thus accounting for the extraordinarily high incidence of disease and parasitisms in Iowa flocks, and that supplied the inferior product for the market. Along with the others, many large poultry plants have been developed, where sanitary conditions obtain, skilled veterinary service is employed in disease control, loss from disease is held to a minimum, high class products are marketed, and profits have been uninterrupted. These plants are available as examples to that large group of small producers who are now forced to reform their methods or go out of market poultry production.

Nor has the educational program wholly failed, as the spectacular events of the last few months would indicate. Some parts of it have been surprisingly successful. Many Iowa producers are identified with the national poultry improvement association. Work with the hatcheries has been unusually productive. This has been carried out by Dr. Alva L. Howard, a veterinarian with the state department of agriculture. So successful have been his efforts that a large percentage of the hatcheries, including most of the large hatcheries in the state, incubate eggs only from selected, pullorum tested flocks of high egg production. Thus there is available a large supply of healthy, well-bred baby chicks which must be the foundation of any healthy, profitable flock.

■ Confronted with the situation publicized by the New York health department, Mark Thornburg, Iowa Secretary of Agriculture, notified the state's several hundred licensed poultry buyers that 13 meetings for their instruction would be held in different parts of the state during March. Attendance was practically mandatory. These meetings were in charge of Mr. Earl E. Mason, executive secretary of the Carlot Egg and Poultry Shippers Association of Iowa, who explained

the situation fully to the assembled dealers. They were addressed by Mr. B. D. Brownlee, chief food inspector of the Iowa Department of Agriculture, who explained the provisions of Iowa law which prohibit either purchase or sale of diseased poultry, and warned the dealers that the law would be rigidly enforced. Two veterinarians from the B. A. I. force in Iowa—Dr. J. S. Koen and Dr. G. B. Senior—attended and addressed the meetings, explaining what must be done to rescue the poultry industry from further disaster and urging each dealer in his own self-interest to carry the message to all from whom he purchased poultry. They urged that poultry producers discard the plan of relying upon the venders of proprietary poultry remedies for disease control and to take disease and sanitation problems to their local veterinarians, who alone understand them, pointing out that the pill peddlers' plan of controlling poultry disease had signally failed and that it was time to discard it. Finally the meetings were addressed by Dr. Alva L. Howard, Veterinary Inspector of the Iowa Department of Agriculture, who explained the availability of healthy, well-bred baby chicks from accredited hatcheries, and by Mr. E. B. Heaton, president of the American Institute of Poultry Industries, Chicago, who explained the advantages of cultivating the good will of consumers by supplying a superior product. He reminded the dealers of the warning, previously given them by the Institute, of what would happen to them if they did not mend their ways.

IOWA CARLOT POULTRY DEALERS

Meetings such as this with an attendance ranging from 100 to 200 were held at 13 points in Iowa. They were addressed by Earl E. Mason, secretary of their state association, B. D. Brownlee, chief food inspector of the state Department of Agriculture, Dr. A. L. Howard, veterinary inspector of the state Department of Agriculture, E. B. Heaton, president of the American Institute of Poultry Industries, and Drs. J. S. Koen and G. B. Senior of the local B. A. I.

■ This educational program for dealers, designed as it was to enter the consciousness via the pocketbook, and supported by the threat of prosecution, is believed to have been very successful.

Simultaneously with the program of instruction for poultry dealers, a far more extensive educational program was undertaken for producers. It consists of afternoon meetings arranged by county agents, to

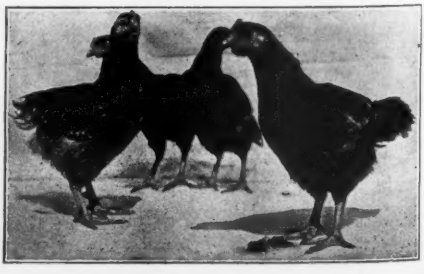
which producers are invited to bring ailing birds. Dr. J. M. Wineinger of the B. A. I. force has been assigned by Dr. J. A. Barger, Inspector in Charge for Iowa, to attend these meetings. He discusses poultry diseases, their cost and the means of prevention, and invites questions from the audience. Afterwards the meeting is turned into a clinic at which the ailing birds are discussed and a number of necropsies held. The advice given the producers includes that to rely upon their local veterinarians and not upon the pill peddlers for the control of disease in their flocks. Local veterinarians are invited to these meetings and have an opportunity to discuss the subjects under consideration.

NECROPSY OF BABY CHICKS AT POULTRY PRODUCERS' MEETING

Front row, left to right: Dr. G. B. Senior, Dr. J. M. Wineinger (in white), Mr. Earl E. Mason, secretary of the Carlot Egg and Poultry Shippers' Association of Iowa, Dr. J. A. Barger, B. A. I. Inspector in Charge for Iowa, Dr. J. S. Koen, B. A. I. Iowa field force

Thus the problem of improving Iowa poultry products at their source and of decreasing the staggering total of disease has been officially committed to the veterinary profession of the state. Fortunately the profession is prepared to discharge the responsibility. During the past several years, under the leadership of Dr. C. D. Lee of the Veterinary Research Institute of Iowa State College and with the support of the federal B. A. I., poultry clinics for veterinarians have been held all over the state, and for an even longer period poultry pathology has been given a prominent place on the programs of many state, district and county veterinary meetings.

The extent to which the producers will go along with their leaders of course is uncertain at this time. Old habits are difficult to break, and the proprietary remedy fraternity are well entrenched and politically powerful in Iowa. In any case, it seems certain that veterinary service will be more largely employed in the future than it has been in the past, and that the Iowa poultry industry will be benefited, not overwhelmed, by the loss of its market outlet for unfit products.



COMMITTEE CHAIRMEN ON LOCAL ARRANGEMENTS FOR AVMA CONVENTION

Seated (left to right): Dr. C. Harvey Smith, Crown Point, Clinic Restraint; Dr. G. E. Botkin, Marion, Banquet and Ball; Dr. R. E. Kepner, New Castle, Ass't General Chairman; Dr. J. L. Axby, Indianapolis, General Chairman; Dr. J. G. Hardenbergh, Chicago, AVMA Secretary; Dr. C. C. Dobson, New Augusta, General Secretary; Dr. H. W. Brown, Fort Wayne, Small Animal Clinic; Dr. F. H. Brown, Indianapolis, Hotels and Meeting Places

Standing (left to right): Dr. C. C. Donelson, Indianapolis, Large Animal Clinic; Dr. Edgar D. Wright, Fort Wayne, General Clinic Chairman; Dr. L. P. Doyle, Lafayette, Swine and Sheep Clinic; Dr. Walter K. York, Indianapolis, Public Relations; Dr. Earl Hinkle, Centerville, Board Directors, State Assn.; Dr. F. C. Tucker, Claypool, Poultry Clinic; Mr. J. J. Cripe, Indianapolis, Convention Bureau; Dr. Walter F. Smith, Valparaiso, Clinic Anesthesia; Dr. T. L. Steenerson, Wilkinson, Board Directors, State Assn.

Chairmen not present when this picture was taken include: Dr. D. D. Baker, Wabash, Alumni Luncheons; Dr. J. L. Kixmiller, Indianapolis, Commercial Exhibits; Dr. W. A. Sullivan, Indianapolis, Educational Exhibits; Dr. H. W. Demsey, Huntington, President's Reception; Dr. J. C. Schoenlaub, Indianapolis, Entertainment; Mrs. J. C. Schoenlaub, Indianapolis, Ladies' Entertainment; Dr. R. J. Hoskins, Indianapolis, Parking

THE Committee on Local Arrangements for the 78th Annual Convention of the A.V.M.A. at Indianapolis next August never tires of referring to it as "the world's largest veterinary meeting." Their prediction may be fulfilled, for Indianapolis possesses in greater degree than most other cities the factor of proximity to a large veterinary population. In addition to convenience and low travel cost involved in attendance, the committee stresses entertainment and scenic features which will be made available to those who attend the Indianapolis meeting Aug. 11-15, 1941.

Among the attractive features of Indianapolis and surrounding territory which the local committee asks that veterinarians consider in arriving at their decision as to attendance are the following:

There are over 600 veterinarians in Indiana and each one has pledged himself to make a visit to the next A.V.M.A. meeting one long to remember. These 600 hosts are from every branch of veterinary service—practice, military, research, education, regulatory and commercial.

Indianapolis is one of the most conveniently located cities in the country. It is within 30 hours' ride of 85% of the population of the United States. More veterinarians live within a radius of 500 miles of Indianapolis than within a similar radius of any other large city in the country.

Indianapolis is a beautiful city and worth visiting for that reason alone. Interesting places include the former homes of James Whitcomb Riley, Benjamin Harrison, Booth Tarkington, Meredith Nicholson and Charles Warren Fairbanks; the Indiana Soldiers and Sailors Monument; Indiana's $15,000,000 World War Plaza; American Legion National Headquarters; Indianapolis Motor Speedway; the Sunken Gardens of Garfield Park and many of the more interesting industrial plants.

At the hub of the city is the Monument Circle, the site of the famous Soldiers and Sailors Monument, long one of the city's most distinguishing marks. It is second only to the Washington monument in height and is regarded as the finest piece of monumental architecture in the world. Rich in history, scenery and natural resources, the Hoosier leading city, as well as the entire state, possess every attraction necessary to make a visit pleasant.

Hundreds of veterinarians, convention-bound toward Indianapolis, will pass over a part of Indiana's 12,000 mile network of modern state highways. They lead through ever-changing and ever-interesting scenery —from the industrial areas and the beautiful lake regions of the north through the rich agricultural middle section and to the rugged, picturesque country of the south with its mines and river ports.

The state parks, offering ideal facilities for a day or a week's stop-over as an adjunct to the convention trip, are the pride of all Hoosierdom. From whatever direction one comes, one will find one or more of these splendid parks on or near the highway.

Dog Food Testing

One matter, to which members of the House of Representatives of the American Veterinary Medical Association should give some consideration before the Indianapolis meeting, is the dog food testing program. The time is due when this absurd project should be shelved for more important matters that are pressing for attention.

During a mental blackout, the dog food testing program of the American Animal Hospital Association was endorsed by the House of Representatives of the A. V. M. A. at its Memphis meeting, in the hope that the prestige of the national association would retrieve from failure the A. A. H. A. project which had fizzled badly.

At the time it was pointed out in this magazine that the project was unsound, unworkable and undesirable for the following among other reasons:

1. The A. V. M. A. had no control over it whatever and was merely endorsing, in advance, any action that an independent organization might see fit to take.

2. The testing program was unsound because no standard was set that any acceptable dog food would have to meet. The approval was merely geared to the label and if the label said nothing the seal approved just that.

3. Because the fine meat inspection of the Federal Bureau of Animal Industry (an inspection performed by veterinarians) was not recognized, the flesh salvaged from dead animals in rendering plants being given an equal standing with meat produced under hygienic conditions in abattoirs under Federal inspection.

4. Because no member of the veterinary profession was included in the scientific council organized to pass on dog foods; thus tacitly implying that veterinarians are not competent to pass upon the quality of food for dogs, notwithstanding the fact that the A. V. M. A. has long endeavored to convince public authorities that veterinarians are amply qualified to judge the wholesomeness of meat and milk for human consumption.

5. Because the seal of approval is actually meaningless, in that it states only that the dog foods are "tested and approved as represented on container," while two departments of the Federal government are charged with performing this same service—that of preventing false labeling.

6. Because dog food companies are charged, and charged a high price for obtaining and using the seal of approval creating a situation regarded as repugnant to an impartial award.

These objections still obtain and that they are very real ones has been shown by the working of the project in the past two years. Because these matters were discussed at length in these columns a year ago, it is unnecessary to go into detail at this time. However, one policy of the dog food testing program to which objection was raised last year, has been remedied overwhelmingly.

A year ago, it was objected that the matter had been conducted in secret, that almost no information concerning the project had been given out and that such as had been, was misleading. For example, the definite statement to the House of Representatives in Memphis that the cost of getting the seal of approval was $500 and that this entire sum was paid direct to the University of Illinois for the testing of the food; whereas the truth of the matter is that the charge for obtaining and using the seal is $950, and moreover, that the whole sum is paid to the dog food committee of the A. A. H. A. and of the $950, only $100 is paid the University of Illinois for making the test.

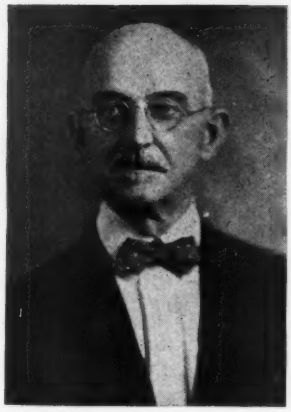
Reversing its previous policy of secrecy, during the past year the dog food testing program has received more publicity than all other projects of the A. V. M. A. combined. Monthly propaganda has appeared

in the official journal and the association's publicity agents have devoted more attention to this than to any other matter. While practically all other scientific organizations are holding conferences on ways and means of assisting the government and the nation in the present emergency, we have been holding conferences to devise means of selling seals of approval to the large packers and other manufacturers of dog food. Whereas secrecy prevailed before, publicity has been so extravagant during the past year as to no doubt lead a portion of the public to think that the veterinary profession is interested in nothing else.

At the Washington meeting of the A. V. M. A. the project received almost no consideration by the House of Representatives, but that at least some members were beginning to wonder about a project over which the Association has no control whatever is shown by the report of the delegate from the Washington State Veterinary Medical Association to the members, which reads in part, as follows:

"There seemed to be considerable difference of opinion as to the desirability of continuing our present program of joining with the American Animal Hospital Association in their program for analyzing dog foods and giving certificates of merit to certain products now on the market. It appears that this program has attracted a very small percentage of dog food manufacturers and not the large manufacturers, as had been hoped. It is my prediction that this matter will continue to come up for consideration and possibly, in the not too distant future, some action may be taken concerning it. It would be my opinion that if the American Veterinary Medical Association is unable to play a more prominent part in the handling of this project that it will withdraw. At the present time all the business is in the hands of the American Animal Hospital Association, and the American Veterinary Medical Association simply approves its recommendations. It is a case where the 'tail wags the dog' and it occurs to me that if the Association is to continue to lend its approval to certain foods, it should be definitely in control of the methods of determining the desirability of such. Above all, it should be completely responsible for financial considerations involved in this program."

Not the least of the disadvantages of the project is that it absorbs the time and effort



Dr. Thomas A. Sigler, Greencastle, Ind., A. V. M. A. Representative to the Advisory Board of the Horse and Mule Association. Doctor Sigler was president of the A. V. M. A. 1926-27, one of three Hoosiers to attain that distinction

of officials of the association and depletes its resources to the exclusion of really important matters. While the dog food testing program has remained stymied, the dog food industry has progressed amazingly. The production of all dog food has increased 35% in the last two years for which statistics are available, canned dog food having attained a production of 501,378,000 pounds and dry dog food of 230,717,000 pounds annually.

* * * *

"Influence" Triumphs Over Science

Says Arthur Roland of the *New York Sun* (Dec. 28, 1940), in an article entitled "Review of 1940 Events in Dog World:" "Another extremely important development for all dogs was the action of the American Veterinary Medical Association in repudiating compulsory vaccination as an answer to the rabies problem. It urged instead, the strict control of all dogs. It was gratifying that in swinging the veterinarians over to this position which represented an abandonment of a previous endorsement of vaccination, the dog world as represented by leading fanciers played a major part. They demonstrated that when fanciers are sufficiently aroused, they can make their influence felt."

Promoting Veterinary Service

IN THE heart of the great American farm belt a change is taking place in the public's consciousness toward live stock health problems—a change in which farmers are coming to realize what modern veterinary service really means to them, and how important such service can be in increasing live stock profits.

It all began several years ago when a group of companies producing the major portion of the nation's anti-hog cholera serum decided that the best way to serve their own interests was through helping to increase the veterinarian's local practice. They concluded that the best way to do this was through a consistent campaign of public education on behalf of the veterinary profession; a campaign to first, make the farmer more conscious of the various live stock diseases, and second, teach him that prompt veterinary diagnosis and treatment provide the best safeguards against such disease losses.

Veterinarians and veterinary groups who were questioned on the subject were outspoken in their approval. Such an effort toward public education had long been needed. Only through broader education of live stock producers could the full value of veterinary service be brought into play. Everyone approved the plan and urged its adoption.

So this group of companies, the Associated Serum Producers, voted the funds to found an educational bureau known as the American Foundation for Animal Health, this bureau to have charge of the entire public education effort. They also made an appropriation sufficient to provide an initial trial campaign of one year in the ten leading midwestern states.

The results of that first year's work were so successful that the campaign has continued ever since without interruption. In fact, the effort has been constantly extended and broadened until today it is proving a potent force in every territory in which it is in operation.

■ Since its inception, the backbone of the campaign has been publicity in leading newspapers and farm publications going into the rural communities of these ten states. The newspaper publicity takes two major forms:

1. *General news releases,* which are issued twice a month directly to more than 1200 newspapers. These releases are of a timely nature, stressing such subjects as hog cholera, swine erysipelas, baby pig losses, encephalomyelitis and enteritis in the spring and summer, and cornstalk disease, bot eradication, influenza, parasites, and kindred subjects in the fall and winter. All these news releases stress the importance of obtaining reliable veterinary service in coping with these diseases.

2. *Illustrated articles,* issued in the form of a series of ten feature articles each season. These are designed for the editorial pages or farm pages of local newspapers. Entitled "Health Hints for Live Stock," they take up various live stock ailments in much the same way as the features on human health problems which appear in many newspapers. Each article is illustrated with an appropriate picture dealing with the disease discussed and each emphasizes the importance of calling a veterinarian promptly when any symptoms of the disease appear. These illustrated articles are now furnished to more than 1,000 newspapers, all located in communities where there are local veterinarians in practice.

■ Hand in hand with the educational work being done through local newspapers is a similar campaign in the farm paper field. Principal elements in this campaign are:

1. *Hog cholera warnings*—a series of eight "reader" items in 18 leading farm magazines in the spring and fall, pointing out the threat of hog cholera, stressing the importance of having pigs immunized, and showing the advantages of having the immunizing performed by a reliable veterinarian.

2. *News items*—regular news service to the leading farm publications similar to the service being given to newspapers, and

stressing various live stock diseases and the importance of veterinary service in treating these diseases.

HEALTH HINTS for LIVESTOCK

PREPARED BY AMERICAN FOUNDATION FOR ANIMAL HEALTH

SWINE DYSENTERY A NEW SWINE MENACE

Swine dysentery or so-called bloody scours is the latest and most serious threat to the feeder-pig industry.

Even though a great deal of research work has been centered on the swine dysentery problem, the exact cause has not yet been identified. At least one scientist, however, claims to have reproduced the disease by feeding healthy pigs on finely ground pieces of intestine from pigs that recently died of the disease.

Dysentery or bloody scours usually appears among newly purchased pigs in from 10 to 30 days. Native pigs on these farms readily contract the trouble from the newly-purchased animals.

Affected pigs develop a high fever about 24 hours before they begin the mucoid, blood-tinged diarrhea that characterizes the disease. The death loss is heavy and pigs that recover very often spend the rest of their lives as long-haired, unthrifty, unprofitable runts. Some of these recovered pigs seem to act as carriers and, once the infection is brought to a farm, the premise is liable to remain contaminated for a long time.

In view of the widespread nature of swine dysentery, it becomes important for every purchaser of new feeder pigs to isolate these animals from his home herd just as soon as they are brought to the farm. They should be inspected at least three times daily and any animals showing wet hind parts should be immediately isolated and a veterinarian should make an immediate diagnosis.

Emaciated appearance and poor condition typical of swine dysentery.

This type of bowel disease should not be confused with the chronic condition "Necro."

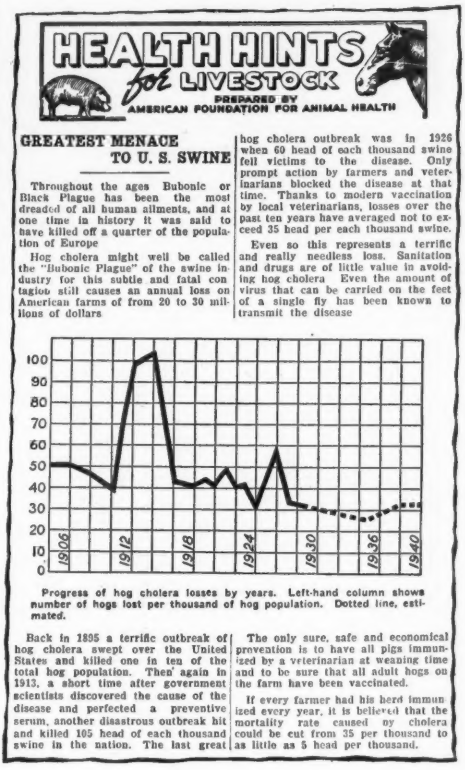
Veterinary research workers have recently advanced the thought that vitamin G deficiency may have a bearing on the occurrence of swine dysentery. Hence such foods as dried milk, buttermilk, alfalfa meal and alfalfa pasture may be helpful.

■ The third important weapon in the campaign of public education is the radio. This effort likewise comprises two major divisions, as follows:

1. *Radio news flashes,* which are furnished monthly to 117 leading radio stations and radio farm editors throughout the ten midwest states. These items in brief form are suitable for use on farm programs, market reports, etc. They stress timely live stock disease dangers, warn the farmers to be on guard against these threats to their live stock profits and emphasize the value of prompt veterinary service to avert unnecessary losses.

2. *Hog cholera warnings,* which are broadcast during the peak of the late spring and summer hog cholera season. These messages pointedly call the farmer's attention to the threat of cholera, the advantage of having his pigs vaccinated without delay, and the importance of having the vaccinating done by his local veterinarian.

■ The Associated Serum Producers have not sought to conduct the campaign in a spectacular way. Rather, it has been their thought to work unobtrusively through these three principal avenues of education and to bring about a public consciousness of the value of veterinary service on live stock disease problems, through exposing farmers gradually but continuously to this constant flow of information. For five years now the effort has been unremitting. Month in and month out, the farmer is given the opportunity to read these news releases and feature articles in his newspapers and farm papers, and to hear them over his radio, until they become a part of his own thinking.



HEALTH HINTS for LIVESTOCK

PREPARED BY AMERICAN FOUNDATION FOR ANIMAL HEALTH

GREATEST MENACE TO U. S. SWINE

Throughout the ages Bubonic or Black Plague has been the most dreaded of all human ailments, and at one time in history it was said to have killed off a quarter of the population of Europe.

Hog cholera might well be called the "Bubonic Plague" of the swine industry for this subtle and fatal contagion still causes an annual loss on American farms of from 20 to 30 millions of dollars.

hog cholera outbreak was in 1926 when 60 head of each thousand swine fell victims to the disease. Only prompt action by farmers and veterinarians blocked the disease at that time. Thanks to modern vaccination by local veterinarians, losses over the past ten years have averaged not to exceed 35 head per each thousand swine.

Even so this represents a terrific and really needless loss. Sanitation and drugs are of little value in avoiding hog cholera. Even the amount of virus that can be carried on the feet of a single fly has been known to transmit the disease.

Progress of hog cholera losses by years. Left-hand column shows number of hogs lost per thousand of hog population. Dotted line, estimated.

Back in 1895 a terrific outbreak of hog cholera swept over the United States and killed one in ten of the total hog population. Then again in 1913, a short time after government scientists discovered the cause of the disease and perfected a preventive serum, another disastrous outbreak hit and killed 105 head of each thousand swine in the nation. The last great

The only sure, safe and economical prevention is to have all pigs immunized by a veterinarian at weaning time and to be sure that all adult hogs on the farm have been vaccinated.

If every farmer had his herd immunized every year, it is believed that the mortality rate caused by cholera could be cut from 35 per thousand to as little as 5 head per thousand.

At the outset, few veterinarians even knew that the campaign was in progress. But each year it has made itself increasingly felt in almost every community. And today, in the ten midwest states where it is being conducted, it is without doubt one of the most potent forces now at work for the good of the live stock industry, as well

as the good of the veterinary profession.

The best indication of the benefits derived by the practitioners themselves is the fact that many state and sectional veterinary medical associations in this area have made it a special point to adopt resolutions commending the good work which the campaign is doing, and urging that it be continued. Many hundreds of voluntary expressions from individual practitioners have also testified to the value of the work which is being done.

In addition to carrying on this intensive educational campaign in the midwest, the Associated Serum Producers are also making the same material available to state veterinary associations and regional veterinary groups in other states throughout the Union. News releases and radio material are now being issued regularly to a majority of these other states, as well as to several foreign countries.

Veterinary Service for All Animal Husbandmen

A front page news story in the *Ft. Bragg* (Calif.) *Advocate* is worth clipping because of its significance in disease control and also because of its rarity. In part it reads:

Dr. Russel R. Vickers, veterinary surgeon, has been appointed State Meat Inspector, and will make his headquarters on the Mendocino coast. He will inspect all meat at the licensed slaughter houses.

In view of the fact that his state duties take up only three days of his time per week, the veterinarian's services will be available to the public.

The Mendocino coast has been without the services of a veterinarian for a number of years. Dr. Vickers' settling here will be a boon to those on the coast who have animals.

Were a similar plan (assigning state work in a community to the veterinary practitioner who serves that community) followed in all the states there would be scarcely a county outside of the range country that could not be provided with a competent veterinary service. Not only would tens of thousands of live stock owners now dependent upon quacks have available an expert private veterinary service, but the state and national animal disease control would be immeasurably improved. By this means, at no cost to the state, the live stock sanitary authority would have a trained representative on guard in every considerable live stock center. Further, such state service as was required would cost less than under present conditions, since the state would be saved traveling and hotel expenses. The greatest advantage of all, next to providing a private veterinary service, however, is the greater efficiency of such an arrangement. Outbreaks of contagious disease are in many respects like a fire; they are much easier stamped out and the loss is far less if they are attacked early than if remedial measures are undertaken later. The outbreak of foot-and-mouth disease in 1914-15 is a striking example of the cost of delay where an infection is concerned. There was a delay of 49 days in discovering the outbreak and instituting control measures, and the total cost of the disease was estimated at 25 million dollars. Judging by the cost of eradicating other outbreaks of this same disease, it is manifest that every day of delay in recognizing and initiating control measures in the 1914-15 outbreak cost the federal and state governments and the live stock industry a half-million dollars—nearly $350 per minute.

If a cow produces 350 pounds of butterfat annually the chances are much in the majority that her daughters will produce less. In a test of 3,183 bulls bred to cows averaging 363 pounds of butterfat the daughters averaged 357 pounds. According to the U. S. Bureau of Dairying, the dairyman's toughest job is to find sires that will increase production, when the herd average is over 350 pounds of butterfat annually.

Except for the breeding of Arab horses, practically all improvement in breeds of live stock has been made within the last 200 years. Robert Bakewell of Leicestershire, England, was the first breeder of record to attempt to fix characteristics by selective mating. Bakewell's experiments attracted widespread attention and his Leicester sheep became famous. Breeders of shorthorn cattle were the first to emulate his example.

New Library Services Available

A microfilm copying service has recently been initiated at the Army Medical Library at Washington, D. C. This copying service will make the resources of the Army Medical Library, the largest and most important medical library in the world, available to a much greater number of research workers and others. As Huddleson has pointed out, and as others have remarked, a vast loss of time and effort and a vast waste of funds result from the not infrequent circumstance of research workers unknowingly duplicating the work of others, spending months or years of effort and thousands of dollars elucidating problems that others have already solved. Regulatory officials also have at times, through unfamiliarity with fact already determined, had their control measures fall far short of what should have been achieved. To cite a single example, the reader is referred to the following quotation from Huddleson:[1]

It is important that this [a review of findings in the field of brucellosis study during the last 25 years] be done, because many who have entered this field of study in recent years and a few who have long been intimately associated with the problem have neglected to review the past to find out how much has been accomplished and, consequently, have missed important contributions that have already been made on many phases of the disease. The newcomer, by his failure to become thoroughly acquainted with the past, often finds himself spending much time and energy in the study of a problem that needs no further elucidation.

One important question, the answer to which was sought and found in the early part of this 25-year period, was the susceptibility of newborn calves to infection; that is, healthy calves born to infected dams and calves exposed to infection by feeding infective milk. The results of these experiments, which proved that young calves could not be permanently infected, paved the road for calf vaccination. This idea of calf vaccination was studied by Buck in 1930, but is only now receiving due recognition.

Further, a wider utilization of the Army Medical Library to supplement other library facilities and current periodicals will expedite the exchange of ideas by veterinary and medical research workers. How advantageous this may be is indicated by the revelations of recent research in canine distemper, swine influenza, and equine encephalomyelitis, to mention but a few.

I. Forest Huddleson, perhaps the foremost living authority on brucellosis, has pointed out the vast loss of time and effort, as well as the unnecessary waste of funds, which has frequently resulted from the duplication of research work by workers unaware of what is being done along the same line by others, or even of work done years, sometimes decades, before. Proper use of the facilities of the Army Medical Library (the largest and most important medical library in the world), and particularly of the new services described here, should do much to correct this all too frequent duplication

Another innovation of the Army Medical Library is a weekly publication, the *Current List of Medical Literature*, to acquaint those doing medical or veterinary research with the titles of all papers in all branches of medicine, including veterinary medicine, appearing in the some 4000 periodicals received by the Library. This enables one to collect for his own files the pertinent papers upon given subjects without the task of searching through the literature in the libraries. This list of current medical literature is issued privately by an organization known as "Friends of the Army Medical Library," 7th St. and Independence Ave., S. W., Washington, D. C. The subscription price is $5.00 a year.

[1] Huddleson, I. Forest, 1941. Progress made in the study of brucellosis during the past 25 years. *J.A.V.M.A.* 98:768, pp. 181-188.

Sulfanilamide Solution

As a Topical Application for Infected Wounds

By AARON APPLEBY, B.S., College Station, Texas*

A. & M. College of Texas, Class of 1941

AMONG the first reports on the topical application of sulfanilamide as a bactericidal or bacteriostatic agent was that of Jensen, Johnsrud and Nelson.[1] These workers implanted from 5 to 15gm of crystalline sulfanilamide in compound fracture wounds and reported that, with no change in surgical technic, the incidence of infection rate fell from 27% to 5%. Bigler and Haralambie[2] have reported on the treatment of chronic osteomyelitis with powdered sulfanilamide and have attributed beneficial action to the drug when used locally in this type of disease condition. Other than the work of Dey[3], reports on the use of solutions of sulfanilamide are exceedingly scant.

■ Symmers and Kirk[4] found that urea solutions in strengths of from 8 to 10% were inhibitive to bacterial growth. Robinson,[5] in summarizing the work of 23 physicians and surgeons on the treatment of various types of ulcers, carbuncles, post-amputation infections, osteomyelitis, gangrene, etc., shows that in all cases solutions of urea produced a conspicuous cleansing of the wound with a lessening of the foul odor. This deodorizing effect of urea has also been reported by Baker.[6]

In regard to the absence of any untoward effects following the use of urea, Muldavin and Holtzman[7] have reported that in 170 cases of axillary and inguinal abscesses, infected wounds, infected hematomata, cellulitis, varicose ulcers, carbuncles, etc., no skin reaction was noted in any case under urea treatment, nor was there a spread of sepsis, any undermining of the wound edges, or necrosis of any living material.

■ In the search for solvents with which to prepare sulfanilamide solutions, propylene glycol and triethylene glycol have been found to be very effective[8], and solutions of sulfanilamide in either of these chemicals, when used in the treatment of infected wounds, are safe. Dr. Herbert Calvery, Chief of the Division of Pharmacology, U.S. Food and Drug Administration, states: "Only propylene glycol, of all the common glycols and their derivatives, is safe to use in food and drug preparations."[9]

The acute fatal oral dose for propylene glycol is 33.5gm per kg body weight for rats;[10] the lethal oral dose of triethylene glycol for rats is 12.5cc per kg body weight, as has been shown by Lauter and Vrla.[11] These authors also report that the additional presence of sulfanilamide causes no increase in toxicity, provided, of course, that doses below the toxic level of sulfanilamide are given. Aside from its solvent properties, propylene glycol has also been shown to have a definite bactericidal effect on *Staphylococcus albus*, hemolytic Staphylococci, hemolytic Streptococci, and Pneumococci, types I and III.[12]

■ There are some wounds in which, by virtue of their position and the anatomy of the affected part, it is difficult properly and thoroughly to keep crystalline or powdered sulfanilamide in contact with the organisms responsible for the suppuration. When sulfanilamide is placed in wounds,

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[1] Jensen, N. K., L. W. Johnsrud and M. C. Nelson, 1939. *Surgery*, 6:1.

[2] Bigler, J. A., and J. Q. Haralambie, 1939. *Am. Jrl. Dis. Chil.*, 57, p. 1110.

[3] Dey, A. C., 1940. *Indian Med. Gaz.*, 75, p. 161.

[4] Symmers, W. St. C. and T. S. Kirk, 1915. *Lancet*, 2, p. 1237.

[5] Robinson, W., 1938. *Am. Jrl. Surg.*, 33, p. 310.

[6] Baker, G. E., 1938. *Rocky Mt. Med. Jrl.*, 35, p. 310.

[7] Muldavin, L. F. and J. M. Holtzmann, 1938. *Lancet*, 1, p. 549.

[8] Unpublished data, Univ. of Rochester, N. Y.

[9] Calvery. H.: Personal communication to Dr. W. M. Lauter.

[10] Weatherby, J. H. and H. B. Haag, 1938. *Jrl. Am. Pharm. Assoc.*, June, p. 466.

[11] Lauter, W. M. and V. L. Vrla, 1940. *Jrl. Am. Pharm. Assoc.*, 29, p. 5.

[12] Robertson, O. H., 1941. *Science*, 93, p. 213.

the blood serum exerts a solvent action on it to the extent of approximately 0.8%. In the blood stream, this concentration of sulfanilamide would be lethal. However, Jensen, *et al.*[1] have shown that whereas the serum and unorganized blood in the wounds so treated had concentrations of sulfanilamide varying from 250 to 666mg per cent, the circulating blood of the patients carried concentrations of only 2.7 to 5.9mg per cent. This systemic concentration is well below the toxic level of the drug. Since bactericidal action is enhanced by high concentrations, and since high local concentrations produce no toxic systemic effects, solutions of sulfanilamide allowing high concentrations and more complete contact are to be preferred to the solid drug.

■ Taking all these factors into consideration, three new sulfanilamide solutions[13] have been developed and were used in the clinical experimentation herein reported. These solutions are:

No. 1: 30gr of sulfanilamide per ounce of propylene glycol.

No. 2: 60gr of sulfanilamide per ounce of solvent consisting of 72% propylene glycol and 28% triethylene glycol.

No. 3: U-S-B solution, containing 40gr of sulfanilamide, 40gr of urea, and a small amount of benzyl alcohol per ounce of propylene glycol.

The sulfanilamide is used for its bactericidal and healing action. It is active against street infections involving mainly *Staphylococcus albus, Staphylococcus aureus, and Streptococcus pyogenes.* It also has a definite action on wounds which brings about the rapid formation of granulation tissue. The propylene glycol and triethylene glycol are used for their solvent action and also for their bactericidal action. The urea has been added to the third solution for its solvent action on proteins, leading to a removal of the debris, encrustations and dead tissues[14] which, mechanically and by harboring bacteria, are usually the chief deterrents to the normal healing of infected wounds. The benzyl alcohol, which is non-toxic and non-irritating in low dilutions,[15] acts as a local anesthetic to reduce pain. Since the optimum concentration of sulfanilamide for the topical treatment of infected wounds through the use of these solutions has not yet been fully determined, all three of the above solutions were tried in the various cases reported.

The amount of solution used is determined solely by the extent of the wound, large wounds naturally requiring more than small ones, and deep, ragged wounds requiring more than shallow ones to achieve complete coverage. The method of application depends upon the type of wound being treated: if the wounds are to be left uncovered, abrasions and other shallow traumata are swabbed liberally with the solution two or three times daily and either left exposed or packed with a saturated pledget; puncture wounds should be packed, in which case the pledget is allowed to remain undisturbed for 24 hours. In cases where the wounds are to be bandaged, they are swabbed with the solution, covered with

[13] These solutions were prepared and supplied for this experiment by the Research Laboratories of the R. J. Strasenburgh Co., Rochester, N. Y.

[14] Holder, H. G. and E. M. MacKay, 1937. *J. A. M. A.*, 108, p. 1167.

[15] Milks, H. J., 1937. *Practical Veterinary Pharmacology, Materia Medica and Therapeutics.* (Chicago: Alexander Eger), p. 199.

"The speed at which a wound heals depends on a large number of variables. These, to quote a few, include its site, extent, depth and degree of raggedness, the apposition of the divided tissues and the factor of infection. Hence the assessment of claims made for substances or methods which accelerate healing presents considerable difficulty. The vast majority of claims rest on clinical impression, which has a tendency to develop into personal preference, and the way in which fashions change and recur as to antiseptics, dressings, irrigation or other treatment of wounds is some indication of the complexity of the problem."—*Lancet*, London.

a saturated cotton pack, bandaged and allowed to remain in this condition for 24 hours. In all cases, the wound is irrigated or washed before the treatment is repeated. Solutions for irrigation and washing which have proved themselves to be satisfactory are physiological saline solution and 5 to 10% urea solution.

In the treatment of infected wire-cuts, nail punctures, bite wounds, ruptured abscesses, suppurating ear conditions and other infected traumatic conditions, it has been found that in general from one to four days is needed to clear up acute infections and to bring about very satisfactory improvement in chronic infections. Once the infection has been cleared up and healing has started, subsequent treatment is as for uncomplicated wounds. This involves the application of healing powders such as boric acid, copper sulphate and boric acid, bismuth-thymol-iodide, bismuth-formic-iodide, chlorinated thymol and thymol iodide, etc., or the use of liquid antiseptics such as 2% potassium permanganate solution, saturated boric acid solution, acriflavine solution, the various tinctures, etc. Repeated use of the sulfanilamide solutions following the arrest of the infection is not advised, since such use may cause the formation of excessive granulation tissue, necessitating treatment with astringents and perhaps resulting in undue scar formation.

Case No. 1.—Light draft horse. This animal had received a nail puncture at the medial angle of the sole of the left hind foot. The wound became infected and remained so after curettage. It was treated for several weeks with a variety of antiseptics but suppuration persisted. It was then cleaned with dry cotton and a cotton pledget saturated with sulfanilamide solution No. 2 was packed tightly into the wound. No bandage was necessary to keep the pledget in place. Twenty-four hours later, when the cotton was removed, suppuration had ceased. In order to insure complete action, the procedure was repeated. On the following day, when the pledget was removed, the wound was still clean and granulation tissue could be seen partially filling it. Subsequent treatment consisted of daily swabbing with an alcoholic antiseptic solution. The animal was released in eight days.

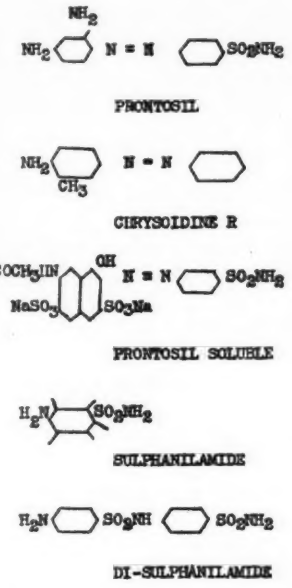
Case No. 2.—Palomino filly. This animal suffered from a wire cut directly above the bulb of the heel of the right forefoot and had been treated by the owner for one week. The wound was severely infected, and suppuration was abundant. After cleaning away the pus and tissue débris, it was found that the wound involved the deep digital flexor tendon. The animal was very lame. The wound was irrigated and packed daily with a cresol preparation. At the end of three days no improvement was noted. On the fourth day urea solution was used for irrigation and a bandage was applied over a cotton pack saturated with sulfanilamide solution No. 1. When the pack was removed 24 hours later suppuration was absent, except from the tissues surrounding the tendon. In addition to repetition of the previous treatment, sulfanilamide solution was injected into the tendon sheath and the surrounding tissues. On the following day, the wound was almost clean and the formation of granulation tissue was clearly evident. The procedure was repeated, and 24 hours later all signs of infection were absent and granulation tissue had formed to the extent that the previously ragged wound was smooth. Subsequent treatment involved the use of urea crystals and 1:1,000 solution of acriflavine. In three days the animal was walking on all four legs and the wound healed normally and steadily.

Case No. 3.—Mongrel dog. It had been struck by an automobile three days previously and suffered from a fractured left tibia, a deep flesh wound on the external surface of the right thigh, a wound of the right carpus which had laid open the joint anteriorly, and several minor abrasions. All of the open wounds were infected. After being cleansed with urea solution, the minor abrasions were treated with alcoholic antiseptic; the thigh and carpal wounds were covered with a cotton pack saturated with sulfanilamide solution No. 1 and bandaged. On the following day the condition of the thigh wound was greatly improved, and the treatment was repeated. The condition of the area surrounding the opening into the joint cavity was also improved, but suppuration within the cavity was abundant. The treatment was repeated with the injection of the sulfanilamide solution directly into the synovial cavity. Twenty-four hours later the thigh wound was free of infection, and subsequent treatment consisted of packs kept moist with dilute urea solution, alternated with packs moistened with saturated boric acid solution. The amount of suppuration from the joint cavity was greatly lessened and the wound had begun to close. The previous treatment was repeated and 24 hours later the cavity was discharging clean synovia. The use of urea solution and of boric acid solution was thereafter resorted to, and healing progressed steadily.

Case No. 4.—Setter bitch. This animal had had an abscess about four inches in diameter on the dorsal surface of the lumbar region. The owner had attempted to treat it by lancing it with a pocket-knife and in so doing had severed several blood vessels with resultant profuse hemorrhage. It was in this condition, with the hemorrhage unchecked, that the animal was presented for treatment. The wound was irrigated with saline solution and enlarged to allow exploration and ligation of the larger vessels. U-S-B solution was applied twice daily by means of a cotton swab, the wound being irrigated with saline solution prior to each application to remove the débris. Infection was absent at the end of the fourth day and the animal was discharged on the 7th day. The main difficulty in this case was in preventing the edges of the wound from closing too rapidly.

Case No. 5.—Mongrel dog. This dog had a hematoma of the ear which had been opened by a layman who had drained the fluid through a small incision and then sutured the wound. When the animal was presented, the ear was greatly swollen and filled with pink creamy pus. A bold longitudinal incision was made and the cavity was irrigated with a mild antiseptic solution. It was then swabbed three times during the day with U-S-B solution and the animal was released that night. The owner was instructed to keep the wound clean and to bring the dog back if infection recurred. The animal was presented four days later for observation. Although the wound had been given poor attention at home, infection was absent and normal healing was well advanced.

Case No. 6.—Smooth-haired fox terrier. The dog was presented with a recently acquired bite wound slightly left of the mid-dorsal line of the neck in the region of the fifth cervical vertebra. The skin wound was a simple puncture, but the underlying tissues had been severely damaged. The wound was enlarged and several hairs were removed from the subcutaneous tissue. The animal was released with instructions to the owner to irrigate the wound three times daily with a 2% potassium permanganate solution. Three days later the animal was returned with a suppurative process which had undermined the skin of the neck ventrally for a distance of approximately three inches. An incision was made at the ventral edge of the phlegmon and U-S-B solution was forcibly injected at the upper opening of the wound until it started to flow from the ventral incision. Twenty-four hours later, the suppurative process had apparently ceased, and the wound was irrigated with 5% urea solution. Irrigation with saturated boric acid solution was carried out twice daily thereafter, and the animal was released on the third day following the cessation of the sulfanilamide therapy. A subsequent report from



Graphic Formulae of a Few of the Versatile Sulfonamide Group

the owner indicated that the wound healed normally.

Case No. 7.—Scottish terrier. This dog had a suppurative bilateral otorrhea of two months standing, and continual treatment involving the use of etherized swabs, the application of boric acid powder, the instillation of astringents, etc., had brought about no improvement. Sulfanilamide therapy was instituted as follows: the ears were cleaned as thoroughly as possible with dry, absorbent cotton, U-S-B solution was instilled in each ear and the excess solution was removed gently with absorbent cotton. Twenty-four hours later the animal appeared more comfortable, and the suppuration in both ears was markedly reduced. The ears were again cleaned with absorbent cotton, and a large amount of detritus was removed. U-S-B solution was again introduced into the ears, and this entire procedure was repeated on the following day. On the fourth day, the discharge removed by the cotton was clean. The sulfanilamide therapy was discontinued and the use of boric acid powder was begun. When the dog was presented for observation ten days later, the only evidence of the original condition was a slight thickening of the skin of the external acoustic meatus.

Case No. 8.—Boston terrier. This dog was brought to the clinic with an infected right anal gland. The suppurative process had not yet reached the stage of "pointing," and, rather than resort to surgery, it was decided to attempt a cure through the use of a sulfanilamide solution. The contents of the infected gland were gently expressed, and sulfanilamide solution No. 1 was injected into the gland through its orifice by means of an 18-gauge needle, the point of which had been rounded off. Ten hours later, the contents of the gland were again expressed, and the injection of the sulfanilamide solution was repeated. Twelve hours later, palpation of the gland showed it to be slightly firmer than normally, but the animal evinced no pain and no pus was present in the material expressed from the gland. Treatment was discontinued, and in two days the gland was normal in size and consistency.

■ The foregoing cases were selected from 18 in which the sulfanilamide solutions were used, and the results obtained are representative of the entire group. No ill effects were noted, except that in a few of the animals under treatment granulation tissue formed so rapidly that it was felt advisable to discontinue the use of the sulfanilamide solutions and to resort to the more common antiseptics such as acriflavine. In these instances, the residual infection yielded readily to the subsequent treatment.

From a review of these cases, it is evident that these new sulfanilamide solutions are valuable adjuncts in the treatment of infected wounds. The use of powdered or crystalline sulfanilamide has been reported on favorably by Bigler and Haralambie,[2] Herrell and Brown,[16] Ecker[17] and others, but heretofore concentrated solutions of sulfanilamide have not been generally available.

Several advantages which solutions of sulfanilamide have over other forms of the chemical for topical use are:

1. They lend themselves more readily to application by injection, swab or pack.
2. They can be more easily applied to bandaged parts by being permitted to soak through the dressing materials.
3. They adhere better to wounds on all parts of the body.
4. When applied to deep wounds by means of a syringe, they reach otherwise inaccessible pockets.

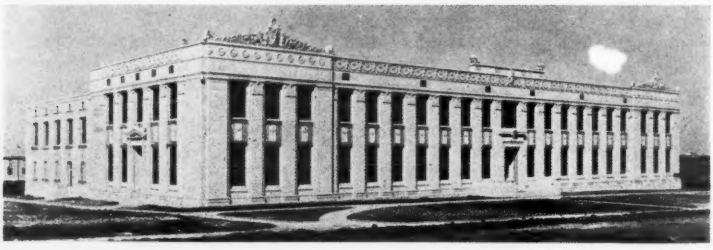
During these trials it was not possible, for various reasons, to compare accurately the relative merits of the three solutions. However, the U-S-B solution appeared to be the most efficacious.

It must be remembered that local sulfanilamide therapy is not offered as a substitute for other methods of wound treatment such as the establishment of drainage, control of hemorrhage, débridement, etc. It is merely a safe and effective aid in the control of the common bacterial infections which so often complicate wound healing. These solutions have been found effective in both acute and chronic infections. Naturally, the best control of infection is that which is instituted as soon as possible after the occurrence of the injury.

ACKNOWLEDGEMENTS

I wish to make grateful acknowledgement to Dr. S. M. Apfelberg, of Yonkers, N. Y., Dr. J. G. Horning, of Houston, Texas, and Dr. W. W. Armistead, of College Station, Texas, for the aid they afforded me in the clinical use of these solutions; and to Dr. R. L. Mundhenk for advice in the preparation of the manuscript. I also wish to thank Dr. W. M. Lauter, of the R. J. Strasenburgh Co., for his advice and his generosity in supplying the sulfanilamide solutions.

[16] Herrell, W. E. and A. E. Brown, 1940. *Proc. Staff Meet. Mayo Clinic.*, 15, p. 611.
[17] Ecker, W. R., 1940. *J. A. V. M. A.*, 97, p. 49.



Veterinary Building, A. and M. College of Texas

Chastek Paralysis a Vitamin B_1 Deficiency

Foxes affected with Chastek paralysis present a striking picture. Careful examination is required to determine that they are not dead, yet they recover completely in 24 hours after an injection of thiamin

THE fur-raising industry now generally realizes that mortalities are often produced on fox and mink ranches from the feeding of fresh and frozen fish. The deaths are due to a disease which we described in 1936[1] as Chastek paralysis, and which we have since shown experimentally to be purely a vitamin B_1 deficiency.[2] Continuation of the experimental work by the University of Minnesota and the Minnesota Department of Conservation, with the cooperation of Fromm Laboratories, Grafton, Wisconsin, has developed new findings of importance to the fur-raising industry.

In our investigation of outbreaks of Chastek paralysis among foxes and mink we have found numerous kinds of fish from both fresh and salt water to cause the disease. Carp has been the kind of fish most frequently causing trouble, but outbreaks have been observed apparently brought about by the feeding of suckers, northern pike, Atlantic whiting, quillbacks, and mullets. Because carp is used so commonly and fed much in the central states, carp has been used in the most recent experiments of Green, Carlson and Evans.

In a series of feeding tests, a diet containing 20% carp was fed to groups of ten foxes, with different quantities of pure vitamin B_1 given each group. From this experiment we conclude that one pound of carp, when fully mixed with a meal, is capable of destroying as much as 3,000 units of vitamin B_1 placed in that meal.

In other experiments, it has been determined that the factor in fish which inactivates vitamin B_1 is not found in the white muscle meat to any degree, if at all. Foxes receiving a ration of carp fillets remained well. Foxes which were fed a mixture of heads, skin, tails and fins, with some scales, developed Chastek paralysis. Foxes fed a ration containing the internal organs developed the disease to the same degree. Both of the latter fractions of fish were more active than whole fish in causing the B_1 vitamin deficiency.

From our investigations at the present time it appears that the vitamin B_1 in a ration is destroyed by actual contact of the food with ground fish. It does not seem that fish fed one day will inactivate vitamin B_1 the next day in a meal which does not contain fish. This probably explains why some fox and mink ranchers can feed fish successfully and others cannot. The results depend upon the way the fish is fed as well as upon the kind of fish and the amount of fish in the diet. Some ranchers evidently feed carp successfully by using it on alternate days or each third day. This would appear to be reasonable in view of our experimental findings.—*R. G. Green,* in *American Fur Breeder.*

[1] Green, R. G., 1936. Chastek paralysis—a new disease of foxes. *Minnesota Wildlife Disease Investigation* 2, pp. 106-107. Mimeographed and distributed by the U. S. D. A.

[2] Green, R. G., C. A. Evans, and W. E. Carlson, 1941. A deficiency disease of foxes produced by feeding fish. *Jnl. of Nutrition* 21:3.

Chemotherapeutic Studies of Infectious Anemia of Horses

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NO THERAPEUTIC agent has been discovered up to the present time that has a specific curative action in equine infectious anemia. During the early investigations of this disease in the United States and in other countries, many of the research workers tried various methods of treatment, employing such agents as arsenical preparations, quinine, mercurial preparations, tartar emetic, trypan red, trypan blue, and a number of others, but without success.

In recent years Mocsy[1] in 1935 reported unsatisfactory results with intravenous injections of bovine serum, 3% formol solution and 0.3 to 0.9% potassium iodide solution. Gambarov, Gubin, and Kulakov[2] in 1936 reported that Mayer's mercurial reagent and trochinol were not effective as a cure. The Montana Agricultural Experiment Station[3] in 1936 reported no positive success when methylene blue, potassium permanganate, and carbolic acid were used in treatment experiments. Kelser[4] in 1936 reported treatment of one case consisting of daily doses of arsenic trioxide, together with intramuscular injections of liver extract in 20cc doses at 2-day intervals, supplemented by transfusion of a liter of normal horse blood in an equal quantity of citrated physiological saline solution. Some noticeable improvement in general condition of the horse occurred during the first few days of treatment, but the animal continued to run a high intermittent temperature and after 16 days of such therapy the red cell count was only 3,340,000. Sundberg[5] in 1936 reported the successful treatment of infectious anemia. Seven cases responded favorably to treatment with potassium permanganate intravenously, together with digitalis, iron, and arsenic given as tonics. Gunneman[6] in 1939 reported evidence to indicate that two doses of potassium permanganate, 400cc of 0.5% solution, administered intravenously at intervals of eight days, were of value for protecting horses against the disease if given before the horses were turned onto known infected pastures.

In sections where the disease is enzootic, practicing veterinarians employ supportive treatment, using arsenical compounds, principally Fowler's solution or sodium cacodylate, together with tonics, rest, abundance of good food, and elimination of intestinal parasites and other debilitating factors. Mercurochrome, quinine, and calcium gluconate and some other drugs are also used.

While the administration of arsenical compounds and other supportive treatment bring about some clinical improvement, the treatment has no lasting value since the animal remains infected, is subject to febrile attacks, and is a virus carrier. To establish a complete cure, a method of treatment must be found that will not only free the animal of clinical symptoms but also completely eliminate the tissue content of the virus. During the course of recent investigations of this disease carried on by the Bureau of Animal Industry, a number of horses infected with infectious anemia and showing different types of the disease became available for experimental treatment. The following described tests[7] were, therefore, undertaken to determine what value if any may result from a prolonged systematic course of treatment with various selected chemicals.

[1] Mocsy, J. V., 1935. Immunisieurungs und Heilversuche beider ansteckenden Blutarmut der Pferde (Immunization and treatment experiments in equine infectious anemia), *Deut. Tierärzt. Wochensch*, Jg. 43, S. 211.

[2] Gambarov, Gubin, and Kulakov, 1936. Chemotherapy of swamp fever, *Ibid.*, 46-49.

[3] Montana Livestock Sanitary Report, Dec. 1, 1934 to Nov. 30, 1936.

[4] Kelser, R. A., 1936. Equine infectious anemia in New England. *Vet. Bul.* Suppl. to the Army Med. Bul., 30:3, pp. 193-196.

[5] Sundberg, R., 1936. Treatment of equine infectious anemia with potassium permanganate, *Svensk Vet. tidsskr.* 41, pp. 14, 21.

[6] Gunneman, Folke, 1939. Some experiences respecting pernicious anemia in the horse. *Skandinavisk. Veterinar Tidskrift.* 29:2.

Material and Methods

The experiments were carried out during 1936, 1937, 1938, and 1939 at the Animal Disease Station, Beltsville Research Center, Beltsville, Maryland.

The preparations used in these experiments were sulfanilamide, sodium sulfanilyl sulfanilate, merthiolate, crystal violet, hydrochloric acid, formin, fuadin, potassium permanganate, and sodium cacodylate. These chemicals were selected either because their action had destroyed the virus in vitro or because they have been reported of value in supportive treatment of infectious anemia or in the treatment of other infectious diseases of man and animals. With the exception of sulfanilamide and sodium sulfanilyl sulfanilate, all chemicals were administered intravenously. Horses affected with acute or chronic infectious anemia which had been experimentally infected during the course of studies on other aspects of the disease were used in the treatment tests. Following the course of treatment with each chemical, blood samples from all the treated animals showing no further febrile attacks or clinical symptoms of infectious anemia were tested for infectivity by subinoculation into normal horses.

All of the horses used in these experiments were of the light type, 900 to 1,100 pounds in weight, and were held under observation in screened stables. Temperatures on all of the test animals were taken and recorded twice daily. The course of the disease in all animals was studied and recorded, and frequent examination of blood samples from the horses treated with sodium cacodylate and hydrochloric acid was made to determine the red cell count and sedimentation rate.

Sulfanilamide and Sodium Sulfanilyl Sulfanilate

Intravenous administration of 450 to 480gm of sulfanilamide in 15gm doses during a period of 21 days and oral administration of 435gm in 15gm doses during a period of 19 days failed to have any favorable influence on the course of the disease in infected animals. Neither did such treatment free infected animals from the virus. Oral administration of sulfanilamide three times daily for four days in quantities that maintained a concentration of the drug in the blood of 20 milligrams per cent or higher for a period exceeding 72 hours failed to arrest the course of the disease or destroy the virus in an infected horse. The administration of 500gm per os of sodium sulfanilyl sulfanilate within a period of 64 hours likewise failed to destroy the virus of infectious anemia in a horse affected with the chronic form of the disease. A detailed report of these experiments has been published.[8]

Merthiolate

Merthiolate is the trade name for sodium ethyl mercurithiosalicylate. This mercurial preparation has a marked germicidal action, and it was, therefore, believed that it may have some therapeutic value in infectious anemia.

Technique of administration.—A 5% solution of merthiolate in physiological saline solution was administered intravenously in 250cc to 375cc doses at intervals of three to five days.

Number of animals treated.—Two.

Case No. 1 (Horse 887).—A chronic case infected 141 days, with five febrile attacks prior to treatment.

Treatment.—Received 1750cc of 0.5% merthiolate solution intravenously in five injections three to five days apart.

Results.—No immediate systemic reaction. Treatment failed to arrest the course of the disease. Febrile attacks continued, animal became moribund, and was destroyed.

Case No. 2 (Horse 802).—An acute case infected one day, with one febrile attack prior to treatment.

Treatment.—Received a total of 1,750cc of 0.5% merthiolate solution intravenously in five injections three to five days apart.

Results.—No immediate systemic reaction. Treatment failed to arrest course of the disease. Febrile attacks continued, animal became moribund, and was destroyed.

Crystal Violet

This dye preparation was used successfully for inactivation of hog-cholera virus and in combination with phenol destroyed the virus of infectious anemia in vitro in at least 30 days.

[7] Acknowledgment is made of the assistance rendered by Dr. J. A. Dollahite in administration of some of the drugs used in these experiments.

[8] Gochenour, W. S., C. D. Stein, O. L. Osteen, 1939. Sulfanilamide in the treatment of infectious anemia, *Vet. Med.*, 34:7, pp. 424-430.

Technique of administration.—A 0.5% solution of crystal violet in sterile distilled water was administered intravenously in 150cc to 225cc doses at intervals of three to four days.

Number of animals treated.—Two.

Case No. 1 (Horse 850).—An acute case infected five days, with one febrile attack prior to treatment.

Treatment.—Received 600cc of 0.5% crystal violet intravenously in three injections three to four days apart.

Results.—No systemic reaction. Treatment failed to arrest the course of the disease. Febrile attacks continued and the animal died following the third treatment.

Case No. 2 (Horse 893).—A chronic case infected 169 days, with five febrile attacks prior to treatment.

Treatment.—Received 3,525cc of 0.5% crystal violet intravenously in 16 injections at intervals of three to four days.

Results.—No systemic reaction. Treatment failed to produce any improvement in general condition. Febrile attacks continued. Animal continued to be a virus carrier. Infectivity of blood following treatment was confirmed by horse inoculation test.

Sodium Cacodylate

This is one of the arsenical preparations commonly used by practicing veterinarians in supportive treatment for infectious anemia.

Technique of administration.—The drug was dissolved in sterile water and administered intravenously in doses ranging from 80gm at the first injection and gradually increasing to 500 gm. Injections were made at intervals of two to three days.

Number of animals treated.—Three.

Case No. 1 (Horse 904).—A chronic case infected 128 days with 10 febrile attacks prior to treatment.

Treatment.—Received 3,310gm of sodium cacodylate intravenously in 11 injections at intervals of two to three days.

Results.—A temporary improvement occurred in general condition and a slight increase in red cell volume, but this was followed by intermittent febrile attacks. The condition of the horse become progressively worse, and the animal died of infectious anemia two days following the 11th injection.

Case No. 2 (Horse 909).—An acute case infected 15 days, with one febrile attack prior to treatment.

Treatment.—Received 1,100 gm of sodium cacodylate intravenously in four injections at intervals of two to three days.

Results.—No improvement in general condition. Failed to arrest the course of the disease. Animal moribund and destroyed.

Case No. 3 (Horse 891).—A chronic case infected 105 days, with seven febrile attacks prior to treatment.

Treatment.—Received 8,310 gm of sodium cacodylate intravenously in 30 injections, given at two- to three-day intervals.

Results.—No improvement in general condition. Failed to arrest the course of the disease. Red cells continued to decrease in number. Severe intermittent febrile attacks, 12 in number, continued to occur during treatment. Animal died of infectious anemia four days following last injection.

Hydrochloric Acid

Practicing veterinarians have reported favorable results from the intravenous administration of weak solutions of this chemical in supportive treatment of infectious anemia.

Technique of administration.—A 5% solution of hydrochloric acid was administered intravenously in doses of 20cc each daily except on Sundays.

Number of animals treated.—Two.

Case No. 1 (Horse 711).—A chronic case infected 102 days, with four febrile attacks prior to treatment.

Treatment.—Received 1,660cc of 5% solution of hydrochloric acid intravenously in 83 injections of 20cc each daily except on Sundays.

Results.—Improvement in general condition. Increase in red cell count. Febrile attacks continued but were not of a severe nature. After completion of treatment, an infectivity test was made by subinoculation of blood from the treated case into a normal horse which developed infectious anemia, indicating that the blood was still virulent and that the animal remained a carrier. This animal died with infectious anemia about six months subsequent to treatment.

Case No. 2 (Horse 912).—A chronic case infected for 109 days, showing a progressive anemia, and with 10 febrile attacks prior to treatment.

Treatment.—Received 440cc of a 5.0% solution of hydrochloric acid intravenously in 22 injections of 20cc each daily except on Sundays.

Results.—No improvement in condition. No increase in red cell count, which remained extremely low. Treatment failed to arrest the progressive nature of the disease. Intermittent febrile attacks continued, followed by death.

Formin (Urotropine, Hexamethylenamine)

Technique of administration.—The drug was administered intravenously in 10gm doses in sufficient sterile distilled water to dissolve it. Injections were made at intervals of two to three days.

Number of animals treated—Two.

Case No. 1 (Horse 946).—A subacute case infected 134 days, with 16 febrile attacks previous to treatment.

Treatment.—Received 270gm of formin intravenously in 27 injections of 10gm each, at intervals of two to three days.

Results.—No improvement in general condition. Treatment failed to arrest the course of the disease. Animal died of infectious anemia following an acute attack.

Case No. 2 (Horse 951).—A chronic case infected 134 days, with 14 febrile attacks previous to treatment.

Treatment.—Received 270gm of formin intravenously in 27 injections of 10gm each at intervals of two to three days.

Results.—No improvement in general condition. Treatment failed to arrest the course of the disease.

Fuadin

Fuadin is the trade name for the preparation known as stibophen (sodium antimony biscatechol disulphonate of sodium). This preparation of antimony is used extensively for the treatment of heart worm in dogs.

Technique of administration.—A 6.3% solution of the drug was administered intravenously in doses ranging from 40 to 80cc at intervals of two days.

Number of animals treated.—Two.

Case No. 1 (Horse 856).—A clinically recovered virus carrier infected 26 months, with no febrile attacks for 18 months prior to treatment.

Treatment.—Received 472cc of a 6.3% solution of fuadin intravenously in eight injections of 40 to 80cc each every two days.

Results.—No immediate systemic reaction. No change in general condition. Treatment failed to eliminate virus from body tissues. Infectivity test made subsequent to treatment by subinoculation of blood into a normal horse was positive for infectious anemia.

Case No. 2 (Mule 986).—A chronic case infected 183 days, with six febrile attacks prior to treatment.

Treatment.—Received 472cc of a 6.3% solution of fuadin intravenously in eight injections of 40 to 80cc every two days.

Results.—No systemic reaction. No improvement in general condition. Treatment failed to arrest the progress of the disease. Febrile attacks and clinical symptoms continued.

Potassium Permanganate

Technique of administration.—A 1.0% solution of the chemical in sterile distilled water was administered intravenously in one 450-cc dose to one case, and a 0.5% solution was administered intravenously in 350-cc to 400-cc doses to three cases.

Number of animals treated: Four.

Case No. 1 (Horse 910).—An active acute case infected five days. Treatment was commenced during a febrile attack while the animal was very weak.

Treatment.—Received 450cc of a 1.0% potassium permanganate solution intravenously in one injection.

Results.—An immediate systemic reaction characterized by a marked cardiac and respiratory disturbance occurred during treatment. The animal died immediately following treatment, indicating that in this particular case the 450cc of a 1.0% solution of the drug was toxic.

Case No. 2 (Horse 913).—A subacute case infected 77 days, with 13 febrile attacks previous to treatment. Treatment was commenced during the 13th febrile attack while the animal was very weak.

Treatment.—Received 400cc of a 0.5% potassium permanganate solution intravenously in one injection.

Results.—A slight systemic reaction characterized by a slight cardiac and respiratory disturbance. Treatment failed to produce any improvement in condition. The febrile attack continued and the animal died three days subsequent to treatment.

Case No. 3 (Horse 999).—A chronic carrier infected 27 months, with 18 febrile attacks prior to treatment.

Treatment.—Received 1,600cc of a 0.5% solution of potassium permanganate intravenously in four injections of 400cc each at weekly intervals.

Results.—No systemic reaction. Treatment failed to destroy the virus. The animal remained a carrier. Following the treatment, blood from this case when injected into a normal horse produced acute infectious anemia in nine days.

Case No. 4 (Horse 1053).—A chronic carrier infected 11 months, with one febrile attack prior to treatment.

Treatment.—Received 1,550cc of a 0.5% solution of potassium permanganate intravenously in four injections ranging from 350 to 400cc each at weekly intervals.

Results.—A slight reaction manifested by increased respiration and sweating followed the first treatment, but otherwise no immediate systemic reaction occurred. Following the last treatment a considerable swelling occurred near the point of injection due to

the irritant action of a small amount of the potassium permanganate solution that had accidentally escaped into the subcutaneous tissue. Although this animal was affected with a mild chronic type of infectious anemia, the treatment failed to eliminate virus content from body tissues and the animal remained a virus carrier. Following the treatment, blood from this case when injected into a normal horse produced an acute fatal case of infectious anemia.

Summary

In a series of experiments to determine the therapeutic value in infectious anemia of sulfanilamide, sodium sulfanilyl sulfanilate, merthiolate, crystal violet, sodium cacodylate, hydrochloric acid, formin, fuadin, and potassium permanganate, a number of experimentally infected horses were treated either intravenously or orally with these chemical preparations. While a temporary improvement in the general condition and a slight increase in the red cell count were produced by sodium cacodylate in one out of three cases treated, and by hydrochloric acid in one out of two cases treated, none of the other drugs tested had any favorable influence on the course of the acute or chronic form of the disease. Neither did any of the agents used free infected animals from the virus.

* * * *

Three Field Cases of Infectious Equine Anemia

Udall[1] defines infectious equine anemia (swamp fever, recurrent fever) as "an acute or chronic septicemic disease of solipeds caused by an ultramicroscopic specific virus and characterized by recurrent fever." An acute attack may terminate fatally within three days, or an animal may have a series of acute attacks and apparently recover for a period of weeks, months, or even years. In the final, fatal attack, the symptoms are usually acute. The hemoglobin may vary from 60% to as low as 30%. However, Van Es *et al.*[2] note that "many cases of swamp fever terminate fatally without a marked reduction in the red blood cells."

Kinsley in 1910 described this disease among horses in Oklahoma, Kansas, and Missouri. Schalk and Roderick[3] have shown that horses reputed to have recovered from the disease can be demonstrated to be virus carriers by experimental inoculations. They also reported that an artificially infected animal may survive the disease for years without symptoms and then break down. The literature indicates that an infected horse never recovers, but eventually dies of the disease.

In discussing the control of the disease, Udall quotes Scott to the effect that all diseased and infected horses should be destroyed, but points out that this is more easily accomplished in theory than in practice.

Case No. 1.—July 25, 1940, Dr. J. F. Thomas, Oswego, Kansas, received a call to examine a sick horse in the vicinity of Punkin Center, Oklahoma.

History.—The horse, a two-year-old gelding, had been sick for four days. Its appetite was but slightly affected. The farmer, a good horseman, remarked that although the animal had never been worked, it appeared as if its spirit had been broken.

Symptoms.—The animal appeared depressed, showed rapid emaciation, rapid but weak arterial pulse, pronounced jugular pulse, stiffness as if lame, drooping ears, partly closed eyelids, and a temperature of 102.4°F. The mucous membranes were anemic, and the Tallqvist hemoglobinometer showed 60% hemoglobin.

Diagnosis and Treatment.—A tentative diagnosis of equine infectious anemia complicated with strongylosis was made. Forty grains of sodium cacodylate, 500cc of physiological saline solution, and 500cc of 40% glucose solu tion were administered intravenously. A quart of raw linseed oil with two drams of oil of chenopodium was administered *via* the stomach tube. The patient was placed in the barn, where it had access to cool water, prairie hay, and green corn husks.

Three days later the condition of the horse appeared considerably improved. The temperature was 101.6°F., and the appetite was better. The same amount of socium cacodylate, saline solution, and glucose solution was again administered intravenously. The following morning the horse died. The carcass was not available for necropsy.

Cases Nos. 2 and 3.—July 26th, just after dark, a call was received to examine two sick horses north of Welch, Oklahoma.

History.—The patients, a three-year-old filly and her dam, a six-year-old mare, had been working in harness. They were physically

[1] Udall, D. G., 1939. *Practice of Veterinary Medicine*, 3rd Ed.

[2] Van Es, L., E. D. Harris, and A. L. Schalk, 1911. Swamp fever in horses. *No. Dak. Agr. Exp. Sta. Bull.* 94. 168.

[3] Schalk, A. L., and A. M. Roderick, 1923. History of a swamp fever virus carrier. *No. Dak. Agr. Exp. Sta. Bull.*

Top: Case No. 1 (Doctor Thomas in background).

Center: The two center pictures show case No. 3 at the time of examination.

Bottom: Case No. 3 following apparent recovery.

unable to do a day's work at this time. The farmer had lost two horses from the same malady a few weeks earlier, and his son had lost a horse which showed similar symptoms two weeks previously; a month after being in pasture with the father's horses. Both farmers made it a practice to have anthelmintic treatment administered to their horses semi-annually, by a veterinarian.

Symptoms.—The mare had a temperature of 104°F. The anus was completely relaxed and it was necessary to place the thermometer well back in the rectum to keep it in place. The Tallqvist hemoglobinometer showed 50% hemoglobin. The mare was uncertain of her footing and weaved about while walking. Her symptoms were similar to those observed in the preceding case.

The filly showed symptoms identical with those of the mare, except that the anus was not relaxed and anemia was not so pronounced, the Tallqvist hemoglobinometer showing 60% hemoglobin. The temperature was 103°F.

In both animals, a fecal examination disclosed strongyle eggs.

Diagnosis and Treatment.—A tentative diagnosis of equine infectious anemia complicated with strongylosis was made. The mare was given 40 grains of sodium cacodylate, 500cc of physiological saline solution, and 500cc of 40% glucose solution intravenously. A quart of raw linseed oil with two drams of oil of chenopodium was given by the stomach tube. Less than 30 minutes after treatment the mare went down, and stayed down for several hours.

The filly received the same treatment. She showed distress, and slightly colicky symptoms, but did not go down as the mare did.

Early the next morning we drove to the farm expecting to perform a necropsy on the mare, but we found both horses on their feet. They appeared to be in about the same condition as they had the day before, and were eating normally. The same amount of sodium cacodylate, saline solution, and glucose was again given, and in addition a pint of nuxoid and ferric cobalt tonic was dispensed to the farmer.

Two weeks later both horses were apparently well.

Although a positive diagnosis is withheld until the disease recurs, the history and clinical symptoms strongly indicate equine infectious anemia.

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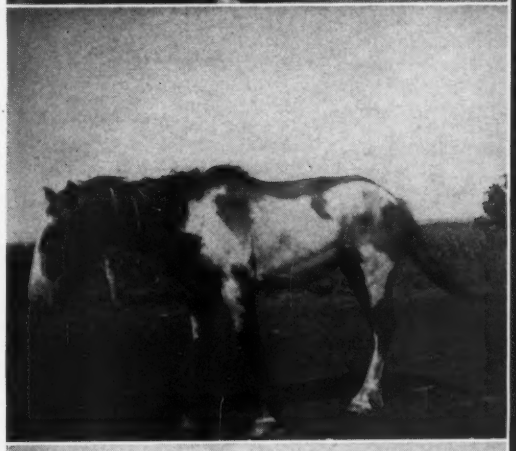

Phenothiazine as an Anthelmintic for Cattle Under Field Conditions

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EXPERIMENTS by Harwood, Habermann, and Jerstad,[1] Swales,[2] Gordon and Whitten,[3] Gordon,[4, 5] Roberts,[6] and Habermann and Harwood,[7] have shown that phenothiazine is a valuable anthelmintic for the removal of gastrointestinal parasites, particularly stomach worms and nodular worms, from sheep, and Swanson, Porter, and Connelly[8] reported that this drug was also of value in removing worms from the alimentary canal of cattle. In view of the high efficacy of the drug for the removal of gastrointestinal parasites from cattle, it appeared that practical field tests should be made in order to observe the effects of the treatment on the general condition of the animals. An opportunity for such tests was developed through the cooperation of farmers in the vicinity of Camilla, Georgia, and the results of these tests are reported in this paper.

History of Herds Treated

All the cattle treated in these experiments had been summered on range pasture and wintered in corn and velvet bean fields, later supplemented with peanut hay and, in some cases, grazed on winter oats, rye, or vetch. The water supply was obtained largely from ponds or small streams on the range, and when the cattle were in the fields, they obtained their drinking water from ponds or wells.

Herd No. 1 comprised 158 animals; Angus bulls, grade cows, and their offspring. Preceding treatment of this herd, necropsies performed on four calves showed them to be heavily infested with *Haemonchus contortus, Trichostrongylus axei, Oesophagostomum radiatum, Bunostomum phlebotomum,* and *Cooperia* spp. One calf was also found to be heavily infested with the tapeworm *Moniezia benedeni.* Fecal examinations of seven other calves revealed extremely heavy parasitic infections. Parasitism was known to have prevailed on this farm over a period of six to seven years, and the cattle had been frequently treated with copper sulphate and nicotine sulphate. During the eight months prior to the use of phenothiazine in this herd, 46 calves were dropped. At four to six months of age, these calves showed pronounced symptoms of parasitism, and necropsies of three of the group revealed an extremely heavy infestation with gastrointestinal parasites. Four of the same group were purchased for use at Moultrie, Georgia, in experiments to determine the efficacy of phenothiazine for removal of gastrointestinal parasites.[8] The remainder of the calves were treated with copper sulphate and nicotine sulphate, with no apparent benefit. By February 13, 1940, the date of treatment with phenothiazine, 23 (50%) of the calves had died from parasitism. The yearlings and grown cows showed undue emaciation and weakness; however, no deaths had occurred. No necropsies were performed on yearlings or cows, but fecal examinations prior to treatment revealed that most of those animals were heavily infected with stomach worms, hookworms, and nodular worms; a few showed only light egg counts. Fecal examinations of 20 cows showed only three to be negative for parasite eggs.

Herd No. 2 comprised 56 grade calves and yearlings. They were a very unthrifty lot of animals bought at live stock sales in south-

[1] Harwood, P. D., R. T. Habermann, and A. C. Jerstad, 1939. Efficacy of commercial phenothiazine in the removal of roundworms from sheep. *Vet. Med.*, 34:7, pp. 440-443.

[2] Swales, W. E., 1939. Tests of phenothiazine, a highly efficient anthelmintic. *Can. Jour. Comp. Med.*, III, pp. 188-194.

[3] Gordon, H. McL., and L. K. Whitten, 1939. A preliminary note on the anthelmintic efficiency of phenothiazine against *Haemonchus contortus* in sheep. *Jour. Counc. Sci. and Ind. Res., Australia,* XII, p. 207.

[4] Gordon, H. McL., 1939. A preliminary note on the chemotherapy of oesophagostomiasis of sheep with special reference to the efficiency of phenothiazine. *Jour. Counc. Sci. and Ind. Res., Australia,* XII, pp. 203-206; erratum (4), p. 347.

[5] Gordon, H. McL., 1939. The anthelmintic efficiency of phenothiazine. *Australian Vet. Jour.*, XV, pp. 245-252.

[6] Roberts, F. H. S., 1939. The value of phenothiazine in the treatment of oesophagostomiasis in sheep. *Australian Vet. Jour.*, XV, pp. 237-244.

[7] Habermann, R. T., and P. D. Harwood, 1940. The efficacy of recrystallized phenothiazine for the removal of nematodes from the gastrointestinal tract of sheep. *Vet. Med.* 35:1, pp. 24-29.

[8] Swanson, L. E., D. A. Porter, and J. W. Connelly, 1940. Efficacy of nonconditioned phenothiazine in removing worms from the alimentary canal of cattle. *J.A.V.M.A.* 96:759, pp. 704-707.

west Georgia. In spite of good feed and care, these animals failed to improve and, up to date of treatment with phenothiazine five

age for cattle of this area, but their general appearance was poor, and two cases of submaxillary edema were noted.

Fig. 1. General appearance of cattle in Herd No. 1 prior to treatment. Note the shaggy appearance and poor condition of both calves and cows

of the original 61 purchased had died from heavy parasitic infestation, as determined by necropsies.

Herd No. 3 comprised 25 grade calves and grown cows. Although these animals were average grade range cattle, they were very unthrifty. Their general condition indicated that they were suffering from intestinal parasitism; however, no death losses had occurred.

Herd No. 4 comprised 20 common grade yearlings. These were in very poor condition, and in spite of an abundance of good feeds and attention, they showed no gain or improvement; they were pot bellied, thin, and rough.

Herd No. 5 comprised 108 good grade Hereford calves, yearlings, and cows. In spite of good feed and care, these animals failed to make normal gains. There was no extreme emaciation among the animals of this group, but their general condition and the lack of response to feeds indicated that they were heavily parasitized.

Herd No. 6 comprised 132 grade Hereford calves, yearlings, and cows. Notwithstanding the fact that this herd was better fed than is the rule in south Georgia, the calves and yearlings showed symptoms of heavy parasitism. Submaxillary edema (bottle jaw), emaciation, pot bellies, taggy and rough hair coats were common, but few deaths had occurred.

Herd No. 7 comprised 38 Hereford cows and calves. Previous range conditions for this herd are not known, as they were shipped into south Georgia. Their condition was aver-

Materials and Methods

The animals treated were selected because of general run-down condition, manifesting marked unthriftiness, emaciation, anemia, dejected appearance, rough hair coats and, in many cases, diarrhea, with some cases of submaxillary edema, and because they were from herds where actual death losses had occurred. The animals were fasted 18 to 24 hours before the phenothiazine treatment was administered, but were allowed access to water. The drug was administered in hard gelatin capsules, according to the following dose schedule:[9]

Calves 3 to 4 months old.....30gm
Calves under 150 pounds.....40gm
Calves 150 to 250 pounds.....50gm
Calves 250 to 400 pounds.....60gm
Yearlings and weak adults.....70gm
Adult cows, bulls, and steers.....80gm

Mass treatment was not attempted, as the owners objected to such a procedure, stating that they preferred to know the definite dose given each animal.

In preparing phenothiazine for administration to these animals, it was found that

[9] These dosages may be computed in ounces on the basis of 28.35gm to the ounce.

½-ounce capsules hold 10gm and 1-ounce capsules 20gm, provided the drug is well packed. By puncturing the end of the long section of the capsule, the drug can be packed easily; one soon obtains a considerable degree of accuracy in getting the right amount of drug in each capsule. By combining ½-ounce and 1-ounce capsules of the drug, the desired dosage for any size animal can be obtained. The capsules are lubricated with mineral oil, petrolatum, or a thin grade of motor lubricating oil, and administered *per os* with a balling gun, using ½- and 1-ounce size guns.[10] In administering the capsules to cattle, the animal's muzzle is slightly elevated, and the neck held in a straight line with the body by means of bull tongs. The balling gun with capsule is passed quickly over the bridge of the tongue and the capsule released by withdrawing the gun as the plunger is pressed. Oiling the capsules greatly facilitates swallowing. Dry capsules are difficult to administer. It is advisable to use ½-ounce capsules in treating small calves, to avoid choking.

All cattle were returned to feed immediately following administration of the drug.

Fig. 2. The 23 calves from Herd No. 1, 104 days after treatment

Results

On the day following treatment, some of the animals were sluggish, but the majority fed normally. Occasionally a weak young calf showed muscular incoordination and was unable to follow the herd. Such calves were placed in pens and allowed to nurse, and on the following day were found to have entirely recovered. The calves showing these adverse effects were in the first herds treated and had received 40gm of phenothiazine. Because of their reaction to the drug, the dosage for this size animal was reduced to 30gm, as recommended in the schedule. No detrimental effects were noted, even in small calves, when the smaller dosage was given.

Observations on these herds were made once a week over a period of six months. On the whole, the treated animals showed rapid and marked improvement in general condition and appearance; however, about 2% of the 537 animals treated failed to show as great improvement as that shown by the others, and the present condition of these animals indicates that retreatment is advisable. Out of 537 calves, yearlings, and cows treated, not a single death occurred that could be attributed to the effects of the drug. Deaths occurred following treatment only in herd No. 2. These

[10] A skillful operator can administer capsules four times as fast as an equally skillful operator can drench an animal, and with greater ease to the animals and workers.

deaths occurred within three to 25 days after the drug was administered. Necropsies on these animals showed large amounts of sand in the abomasum and large intestine. These animals were also emaciated. No lesions were found that could be attributed to the effects of treatment. Observations on this entire group of cattle over a six-month period have shown marked improvement, the hair coats becoming bright, while the animals in general gained in weight to a very marked degree.

The beneficial results of the use of phenothiazine are best shown in herd No. 1, where extreme parasitism was verified by necropsies and fecal examinations. Figure 1 illustrates the general appearance of these animals prior to treatment, while Figure 2 shows the condition of the remaining 23 calves 104 days following treatment with phenothiazine. These cattle have continued to improve over the six-month period. Figure 3 shows the general improvement of the entire herd on February 13, 1941, or one year following treatment. This herd was maintained under the same farm management, fed, and cared for as in previous years. They were grazed on oats, native grasses, rye, and vetch, and in the winter were fed peanut hay as a supplement. Minerals were kept before the herd at all times prior to and following treatment.

Summary and Conclusions

1. Unconditioned phenothiazine as an anthelmintic was tested under farm conditions on 537 cattle of various ages and was found to be efficient and economical when used at a dose rate of 30, 40, 50, 60, 70, or 80 grams, depending on the size of the animal, this schedule applying to all animals from three-months-old calves to adult cattle.

2. The drug was found to be comparatively non-toxic.

3. The drug is easily administered in ½-ounce and 1-ounce capsules, and appears to be a practical, as well as a highly efficacious treatment for cattle under farm and range conditions.

4. The capsules should be lubricated to facilitate ease of swallowing.

5. Single treatments have given results superior to frequently repeated dosings with other anthelmintics.

6. Animals to be treated should be fasted 18 to 24 hours and allowed access to water.

7. Animals may be turned out to pasture or fed immediately following treatment.

Fig. 3. Herd No. 1. One year following treatment with phenothiazine; compare with Fig. 1, taken prior to treatment

Whole Blood in the Treatment of Anaplasmosis

By R. B. KOGER, Belvidere, Kansas
Kansas State College, Class of 1941

Anaplasmosis is a specific infectious disease of cattle and sheep occurring in a mild, acute, peracute, or chronic form, and characterized by extensive destruction of red blood cells by the blood parasite, *Anaplasma marginale*. Positive diagnosis is made by microscopic determination of the anaplasma bodies in a stained blood smear. First reported in California and Kansas in 1925, by 1939 the disease had been diagnosed in 21 states.

The insect vectors responsible for the dissemination of the disease are primarily ticks. Some 14 different species have been incriminated as carriers of the disease, either hereditary or mechanical. The disease can also be transmitted from one animal to the entire herd by contaminated dehorning saws, hypodermic needles, or other instruments.

The reader is referred to the literature on the subject[1] for a discussion of symptoms and diagnosis of the various forms of the disease. One symptom of importance has not been mentioned in the literature. In animals affected with anaplasmosis, a peculiar throbbing sound may be heard in the left flank, simulating the beat of the heart. It may be due either to increased transmission of the heart sounds through large vessels, or to increased amplitude of the pulsations of the posterior aorta. The milder the case and the nearer the animal to recovery, the fainter the sound. It is invariably heard in anaplasmosis cases and is pathognomic of the disease.

A variety of treatments have been advocated. Probably sodium cacodylate-dextrose therapy has been more extensively used than any other treatment, but many practitioners have not been satisfied with the results of this method.

It is an established fact that the animals which have recovered from clinical symptoms of anaplasmosis remain carriers of the disease for many years and probably for life. This fact suggests that affected animals should not be treated, but should be slaughtered to prevent spread of the disease. However, the economic value of the animal in many cases makes a compromise necessary, the animal being treated and then slaughtered as soon as it is in condition, thus salvaging at least part of the value of the animal. When the practitioner treats such an animal, he should warn the owner emphatically of the dangers of the carrier situation and advise him to send the animal to the abattoir as soon as feasible.

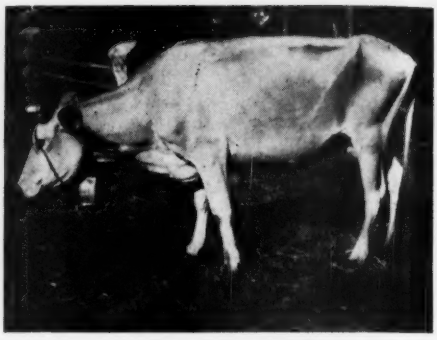

Fig. 1. Typical attitude in anaplasmosis. Note emaciation

The whole blood treatment described herein has been used for the past three years by Dr. E. W. Meads of Claremore, Oklahoma, with substantial success. Doctor Meads had used the sodium cacodylate-dextrose treatment for a number of years, but his dissatisfaction with results led to his trying the transfusion of normal whole bovine blood to his anaplasmosis patients. He found that this reduced his losses materially.

In making the transfusion two methods may be used. The blood may be obtained from slaughtered cattle, oxalated or citrated, and stored in sterile bottles under refrigeration until needed. It has been found that blood so treated may be stored for 10 to 14 days at 35° F. without appreciably reducing its effectiveness. This method is most satisfactory when a large number of cases

[1] See for example: Schmidt, H., 1936. Anaplasmosis in cattle. *Vet. Med.* 31:10, pp. 427-429. Udall, D. H., 1939. *The Practice of Veterinary Medicine*, pp. 612-616. Hutyra, Marek and Manninger, 1938. *Pathology and Therapeutics of the Diseases of Domestic Animals*, I, pp. 878-883.

are to be treated. Before injection into the animal, the blood is warmed to approximately body temperature by immersing the bottles of blood in a warm water bath.

The second method is obtaining the blood from a normal healthy animal on the farm. The donor animal should be examined carefully for evidence of any disease before the

Fig. 2. Doctor Meads administering blood to the animal in Fig. 1

blood is taken. It is then confined to a corral fence or gate by a lariat around its neck and body in such a way that the loop causes distention of the jugular vein and the remainder of the rope confines the animal to the fence. A large bleeding trocar is inserted into the vein, and the blood is collected in sterile pint bottles containing 20cc of 5% potassium oxalate or sodium citrate. From 2,000 to 3,000cc may be collected rapidly in this manner. The blood is immediately transfused into the jugular vein of the affected animal with an intravenous outfit. Reaction to the transfusion is rare, but the possibility of shock should not be entirely disregarded. Five hundred cc of dextrose may be given to bolster the animal's strength, if this is deemed necessary.

The owner should be advised to keep the animal confined in a small corral, or in a barn. Rest is essential, since the extensive destruction of erythrocytes reduces the oxygen-carrying power of the blood, causing the animal to tire easily. Feed should con-

Fig. 3. "Recovered" cases of anaplasmosis. The white-face was treated June 11, 1940; the Jersey June 4. The picture was taken July 11

sist of mildly laxative feeds such as bran mash, and the roughage allowance should be decreased. Purgatives and enemas are unnecessary and should not be given the already debilitated animal.

The theory of the use of blood in anaplasmosis is not unlike that in any anemia or in hemorrhage. Following the destruction of red blood cells in such appalling numbers as three to five million per cc, an anoxemia is established; the entire body is consequently weakened. Body processes are slowed, the temperature becomes subnormal, the intestinal tract loses its tone, and the liver is overworked in its attempt to remove the numerous dead red blood cells. The transfusion of whole blood enables the body to overcome the lowered vitality and to successfully combat the infection by means of intrinsic bodily defense mechanisms.

While this treatment is by no means perfect, it does represent a method of reducing losses. The following chart shows the results Doctor Meads has obtained from its use.

Year	No. of Cases	Treatment	Lived	Died	% Mortality
1938	15	Na cacodylate dextrose	5	10	67%
1938	32	Whole blood	24	8	25%
1939	11	Whole blood	8	3	27%
1940	17	Whole blood	12	5	29%

However, this chart does not tell the whole story. Nearly all the animals treated with whole blood were given only one transfusion. In Dr. Meads' opinion, some of the animals that died could have been saved by another

transfusion one to three days following the first.

With this treatment the animals recover their vitality with amazing celerity. Usually within two to three days following treatment the animal is eating and ruminating normally. Lactation is back to nearly average within two to four weeks, even in severe cases. The animals overcome the emaciation and cachexia of the disease within a short time and can then be shipped for slaughter.

Sodium Chlorate Poisoning in Cattle

Sodium chlorate has been recommended widely by agriculturists for destruction of obnoxious plants in fields and pastures. U.S.D.A. Farmers' Bulletin No. 660 states that, "Sodium chlorate is a powerful plant poison, deadly to all kinds of vegetation, though not toxic to animal life under ordinary circumstances." Live stock owners are prone to spread this chemical promiscuously over undesirable weed patches without any thought of danger to grazing animals. Because it is so generally considered harmless, veterinarians may fail to consider it in their diagnosis.

Early on the afternoon of August 3, 1940, the writer accompanied Dr. A. J. Knilans of Janesville, Wisconsin, on a call for treatment of nine valuable Holstein milch cows that had been noticed to be acutely ill at milking time that morning. Two of the most critically affected animals had received previous treatment, the nature of which was not determined. One of these had died within a short time after the illness was first observed, and the condition of the other was such that a grave prognosis was given. Questioning of the attendant revealed that the dairy herd had been pastured on a field of barley and sweet clover for the first time on the preceding afternoon. No other change in the dairy ration had been made recently. Upon examination of the field nothing was observed.

The affected cows presented similar symptoms which varied somewhat in severity. These consisted of depression, loss of appetite, a dark bloody diarrhea, and reddish brown urine, suggesting hemoglobinemia. The most seriously affected cow also exhibited more advanced symptoms, including a temperature of 97.5°F., cold extremities, pale mucous membranes, hyperpnea, and collapse. Terminal convulsions were observed upon her death. No diagnosis was made.

Treatment of the remaining affected animals was symptomatic and consisted of: mineral oil, one gallon; methylene blue, 12gr; sodium nitrite, 60gr; and sodium thiosulphate, 120gr per os; and saline solution, 500cc intravenously for each animal. Except for the cows previously mentioned, complete recovery followed in each case.

Upon necropsy of the last animal to die, the urinary bladder was found to contain a quantity of material having the appearance of coagulated blood. The mucosa of the small intestine was congested and exhibited large eroded areas. The ingesta was colored deeply by blood that had escaped into the intestinal lumen. The kidneys were dark and congested.

About a month later Doctor Knilans was again summoned to this dairy farm to treat six cows presenting symptoms similar to those previously given attention. This time, however, the attendant reported remembering that before each attack, the owner had applied sodium chlorate to thistles along the fence rows of the field in which the herd was grazing. The treatment administered was the same as for the previous attack. No deaths occurred.

Toxicologists[2] indicate that the injurious action of chlorates may be attributed principally to their combination with hemoglobin to form methemoglobin, thus diminishing the oxygen transporting power of the blood stream. Hemolysis accompanied by hemoglobinuria also occurs. In more severe cases an acute nephritis may be produced, allowing passage of blood proteins into the urine. This action accounts for the coagulated material found in the bladder of the cow examined post mortem.

[1] Sollman, *A Manual of Pharmacology and its Application to Therapeutics* (W. B. Saunders Co., Philadelphia), pp. 890-891.

[2] Thienes, C. H., *Clinical Toxicology* (Lea & Febiger, Philadelphia), pp. 149-150.

Treatment of methemoglobinuria thus far has been limited principally to reducing agents such as sodium thiosulphate. This line of therapy has been successfully applied in cases of hydrocyanic acid poisoning. However, McCulloch and Murer[3] administered corn sugar, sodium thiosulphate, and other similar drugs as antidotes to experimental animals given lethal doses of sodium chlorate, and report no beneficial action was observed. They are unable to recommend any specific treatment.

Fitch, Boyd, and Hewitt,[4] of the University of Michigan, have observed that: "Certain cattle have a particular liking for sodium chlorate and eagerly consume forage or lick soil upon which the salt has been sprayed." They produced symptoms indicating approaching death in an experimental animal to which they administered 30gm, 60gm, and 90gm doses on three successive days. Thus, with agriculturists recommending application of 400 lbs. of this chemical per acre,[5] it is very possible that more cases of poisoning in live stock should be laid at the door of sodium chlorate than have been suspected.

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[3] McCulloch, E. C., and H. K. Murer, 1939. Sodium chlorate poisoning. *J. A. V. M. A.* 95:753, pp. 675-682.

[4] Fitch, C. P., W. L. Boyd, and E. A. Hewitt, 1929. Toxicity of sodium chlorate ($NaClO_3$) for cattle. *Cor. Vet.* 19, p. 375.

[5] U.S.D.A. Farmers Bulletin No. 660. Weeds: How to kill them, p. 21.

Fig. 1. The shorthorn bull treated for fracture of the tibia, following uneventful recovery

Successful Treatment of Tibial Fractures in Cattle

This report deals with the treatment of eight cases of tibial fracture in cattle by Dr. A. H. Gish of El Dorado, Kansas, from July, 1939, to December, 1940. The cases included four Hereford cows, from three to seven years of age; one Angus bull, two and one-half years old, weighing 1600 pounds; one shorthorn bull, three years old, weighing 1800 pounds; and two feeder calves.

The treatment of the shorthorn bull will be described in detail; the treatment of the others was essentially the same.

The bull was found in a field, unable to place weight on the left hind leg. He was restrained with the least possible excitement. A definite swelling of the tissues in the tibial area was noticed. The leg was alternately flexed and extended, showing, on palpation, a complete fracture of the tibial shaft at the junction of the middle and distal thirds.

The animal was cast in lateral recumbency on his right side. The entire leg was rubbed with a mixture of one part chloride of lime to four parts borax and bandaged tightly from the toe to the tibial region just above the hock. It was impossible to continue the bandage higher because the taper of this fleshy part of the leg prevented it from remaining in place.

A 17-foot piece of ⅜ inch gas pipe was bent gently in the middle until a complete loop was formed, the circumference of which was made to correspond exactly with that of the leg at a point high in the flank medially, and on a level with the hip joint laterally. The pipe was further bent around this loop until the ends were parallel and in such a position that, when applied, they were parallel to the leg, one anterior, the other posterior. These ends were then bent to fit the form of the leg in its natural position, one end being carried between the toes at the level of the sole and secured to the opposite end on the other side. In this manner was formed a one-piece, continuous crutch—actually a modified Thomas splint. The parts of the splint coming in contact with the skin were padded and wrapped with bandage before the device was applied.

The splint was secured in place by muslin bandages, and it was then possible to bandage the leg to a higher level, since the splint formed a means of attachment.

An application of sodium silicate was applied to all of the exposed wrapping. An additional light wooden splint was placed diagonally across the fracture and secured at both ends to the pipe. To this second splint the leg was bandaged tightly at the point of fracture. A second complete wrapping of the entire leg, including the splints, was made, and all parts again covered with sodium silicate and allowed to dry.

The bull was turned into a small enclosure, and the owner instructed to observe him closely for signs of weakness in the cast, necrosis of the skin, etc. He was also advised to place small quantities of steamed bone meal on the feed.

After two days it was noticed the animal was able to lie down and rise without undue difficulty, and that his appetite was normal.

Further recovery was uneventful. The splint was removed after 32 days, when the fractured ends appeared to be solidly grown together in the normal position. A decided atrophy of the leg muscles was present, and the animal would place very little weight on the injured leg. He was confined to the small enclosure for two months longer. Five months following the fracture the animal had regained all lost weight and the lameness had disappeared. He was returned to the herd, and since that time has been used continually for breeding purposes.

Of the eight cases treated, only one, a Hereford cow, was considered to be a complete failure. This animal was wild and the splint was therefore applied under considerable difficulty. When released from confinement she threw herself wildly at all available objects with terrific force, bending the splint and producing further injury to the leg. On the advice of the veterinarian she was destroyed.

The case of the Angus bull was complicated as a result of the owner's failure to find the animal for some time after the fracture had occurred. The animal had followed the herd, and the resulting movements of the fractured bone had destroyed the musculature to such an extent that necrosis and subsequent sloughing of the part was inevitable. Although the fracture itself was responding to treatment in a satisfactory manner, the owner chose to destroy the animal after four weeks rather than to treat the large open wound in order to bring the animal back into breeding condition.

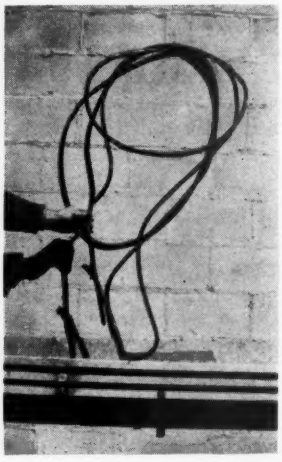

Fig. 2. The type of splint used in the treatment of tibial fractures. It consists of a length of ⅜-inch gas pipe, bent to conform to the shape of the animal's leg. When properly padded and bandaged to the leg, it forms a sort of modified Thomas splint. This splint can be used successfully for cattle of any size, and is remarkably effective in immobilizing the leg for the required length of time

All the other cases responded uneventfully to the same type of treatment. A ¼-inch pipe or small solid rod was found to be the most satisfactory for constructing splints for calves. In each case the animal learned to move about remarkably well, the leg being held by the splint without movement at the fracture. In most cases the splint was allowed to remain in place four to five weeks, with the veterinarian or the owner making such alterations or repairs as seemed necessary.

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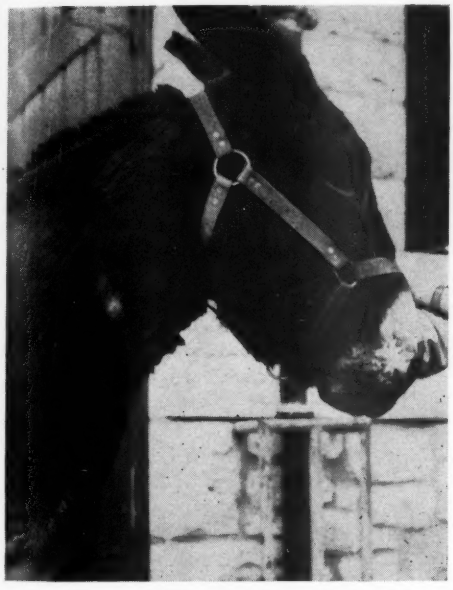
Sporotrichosis in a Jack

February 6, 1941, a six-year-old jack was presented to the veterinary clinic of Kansas State College for examination, with the history that the owner had noticed several swellings on the upper part of the neck six months previously; these had continued to increase in size and number up to the time of presentation.



The patient at the time of admission to the clinic

Clinical examination revealed six firm growths, ranging in size from that of a marble to a golf ball, on the upper part of the neck just above the jugular furrow. One of these growths had broken down and was exuding a cheesy yellow pus. The enlargements formed a chain following the cervical lymphatic system, from the superior cervical to the middle cervical lymph glands. There was also a scaly abraded area about four inches in diameter on the face just posterior to the nostril.

One of the larger nodules was excised and sections of it were examined in the pathological laboratory. These sections were negative for malignant and benign tumors, but upon staining some of the cheesy exudate with Giemsa's stain, large numbers of the fungus *Sporotrichum beurmanni,* were found. This fungus is characterized by rounded enlargements at one end enclosing vacuoles, and can be cultivated aerobically. In pure culture it can be transmitted to horses and mules; it has also been recorded as occurring in man and dog. A diagnosis of sporotrichosis was made.

Treatment consisted of three-quarters ounce of sodium iodide in 500cc of distilled water given intravenously every other day. In addition, the ulcer and the facial lesion were painted every other day with tincture of iodine.

The patient was discharged March 1st completely recovered.

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Bonner Springs, Kans.

* * * *

Brucellosis of Cattle, Farmers' Bulletin No. 1871, issued by the U. S. Department of Agriculture, was prepared by what are termed "specialists" in the Bureau of Animal Industry to acquaint farmers and herd owners with effective means of prevention and eradication of this disease.

The disease may be controlled in several ways, singly or in combination, the bulletin shows, the preference depending upon herd conditions and the severity and extent of the disease in the herd. The test-and-slaughter method is said to have been effective in reducing the incidence of brucellosis under the federal-state program which was begun in 1934. Another method, involving the vaccination of calves, has been officially recognized as a preventive measure where qualified advisers deem conditions favorable.

According to the bulletin the disease may be eliminated from a herd also by the sanitary-control method with special relation to herd management. This plan, which is discussed fully in the bulletin, consists in the isolation of all cows and heifers before they calve or abort so that the organism cannot be passed on to healthy animals.

A copy of F. B. 1871 may be obtained free by writing to the U. S. Department of Agriculture, Washington, D. C.

Nutritional Keratitis in Lambs

By ROBERT D. IMMENSCHUH,[1] Manhattan, Kansas
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DURING the past five years avitaminosis A has become more prevalent among lambs in the Middle West than it was formerly. In some localities this has been a limiting factor in the production of lambs.

Osborne and Mendel found in 1913 that if a certain accessory food substance, later identified as vitamin A, is withheld from the diet, an animal develops among other conditions, eye lesions of various types. Hale [2] has shown by his experiments that sows fed a ration deficient in viamin A give birth to congenitally blind pigs.

Avitaminosis A, manifested by keratitis among the lambs, has been observed recently in two flocks of sheep in the vicinity of Manhattan, Kans.

Flock 1

Jan. 29, 1941, a week-old lamb from a farm flock near Wamego, Kans., was presented for treatment at the veterinary clinic of Kansas State College.

History.—The owner stated that the lamb's eyes had been running for four days, and that of 19 lambs, eight more were similarly affected. Their ages ranged between one week and two months. The ewes were fed only bleached sorghum, were in poor flesh, but were not affected with the eye condition observed in the lambs.

Symptoms.—The lamb (Fig. 1) showed total blindness of the right eye. The cornea was ruptured and protruding. A foul-smelling, purulent exudate was escaping from the anterior eye chamber. Examination of the left eye disclosed a leucoma involving the lower half of the cornea. Increased lacrymation, photophobia and conjunctivitis were also present. The other lambs showed the same symptoms, but in varying degrees. There was a dirty, matted condition of the wool on the face, caused by the downflow of eye secretions, and in a few lambs the eyelids were glued together with a gummy secretion. In some cases the infection was unilateral.

Bacteriological Examination.—The pyogenic microorganisms isolated from the affected eyes were: *Staphylococcus aureus, Staphylococcus albus* and *Escherichia coli.*

Transmission.—Experimental inoculation of susceptible lambs was attempted over a period of two weeks without success.

Flock 2

History.—Feb. 15, 1941, the owner of a flock of sheep on a farm near Manhattan, Kans., noticed that several of his 40 lambs had "sore" eyes. Some were practically blind, and a few died. The ewes were in fair condition, although they were fed only chopped Atlas sorghum fodder with a mineral mixture. Many of the ewes had twin lambs and several were nursing triplets.

Symptoms.—The symptoms were identical to those seen in the lambs in flock 1. In this flock there was an opportunity to observe some of the lambs immediately after birth, and it was found that several were born with a pronounced leucoma (Fig. 2) involving the lower half of the cornea.

Post Mortem Findings.—A detailed necropsy was performed, but no lesions were found other than those previously described as involving the tissues of the eye. The tapetum lucidum was not bleached, as is commonly the case in cattle affected with avitaminosis A.

Diagnosis.—A diagnosis of nutritional keratitis, resulting from avitaminosis A, was made after considering the large number of animals affected, the varying degrees of keratitis, and the history of feeding a ration deficient in vitamin A. Also the congenital affection apparent in flock 2 practically eliminated any other disease. Where congenital affection is absent, it may be difficult to differentiate this deficiency disease from infectious keratitis, commonly called "pink eye." These diseases

1 The writer wishes to gratefully acknowledge the assistance of Dr. Herman Farley, who made the laboratory studies of these cases possbile.

are very similar both clinically and anatomically. Infectious keratitis in sheep has an incubation period of from three to five days, as observed by laboratory studies, and

Fig. 1. Lamb with ruptured cornea and extensive involvement of the anterior eye chamber

Fig. 2. Leucoma involving the lower half of the cornea in a congenitally affected lamb

congenital infection is not in evidence. Nutritional keratitis apparently affects only the lambs, while the infectious disease occurs in animals of all ages, being transmitted to susceptible sheep through the virulent eye secretions. Infectious keratitis is most common during the summer months while nutritional diseases are more prevalent during the winter.

Prevention and Treatment.—The owners of the two flocks were advised to feed the ewes and older lambs well-cured alfalfa hay and ground yellow corn. The lambs most severely affected were given one dram of cod-liver oil three times daily. Creeps were constructed for the lambs, allowing them free access to the feed at all times.

Most of the animals recovered within two weeks, although in a few cases perforation of the cornea with subsequent infection caused permanent blindness.

Discussion

A lack of vitamin A is suspected when eye lesions develop following prolonged feeding on rations deficient in green or yellow color. The normal epithelium of the conjunctiva and cornea is replaced with cornified or keratinized squamous epithelium which is readily invaded by disease-producing organisms. Vitamin A is not synthesized by animals and the supply stored in the liver, fat tissues and glands of pregnant females soon becomes depleted if the animals are not fed adequate amounts of this vitamin. Consequently, the milk from these females contains very little vitamin A or carotene. The carotene found in green plants and the provitamin cryptoxanthin in yellow corn provide the best sources of vitamin A for farm animals.* Carotene is easily destroyed by improper curing of hay. The vitamin A in crops stored for winter use can be preserved by artificial drying and special methods of ensiling grasses and legumes. It is more economical for the farmer to produce or purchase vitamin A in the form of carotene-rich crops than to buy vitamin A or carotene preparations.

Summary

Nutritional keratitis resulting from avitaminosis A may occur in lambs *in utero* or post-natally, when the ewes are maintained on a diet deficient in this vitamin.

Nutritional keratitis may be mistaken for infectious keratitis because of their clinical similarity. The differential diagnosis should include consideration of: type of ration, age of animals affected, incubation period, transmission, and seasonal occurrence.

Prevention of nutritional keratitis, and prompt recovery of animals that are not extensively diseased, may be expected when adequate vitamin A is supplied.

*The value of yellow corn as a source of vitamin A has been overrated. The extent to which cryptoxanthin is transmuted into vitamin A has not been determined but certainly it is much less than is the case with carotene.—Ed.

Successful Treatment of Naphthalene Poisoning

Since cases of the type reported herewith are rather rare, the writer considers it worth while to make a record of it, especially since the treatment adopted brought about favorable results.

January 16, 1941, a female fox terrier, three years old, was presented for examination. The owner said that four days previously the animal had suddenly developed a perverted appetite and had consumed a considerable quantity of "camphor flakes" which had been sprinkled on a large rug in preparation for storage. According to the owner's observation, the bitch showed evidences of a depraved appetite about twice a year. Several hours after the animal had ingested an undetermined quantity (described as "several handfuls") of the flakes, she began to vomit profusely. Appetite was completely lost; and food had been entirely refused during the four-day interval before the bitch was presented for treatment.

At the time of examination, the dog was extremely emaciated, asthenic, and listless. Temperature was subnormal (99.8° F.), and her eyes were very glassy. There was a chorea-like (intermittent) twitch over the right upper eyelid. The coat was dull, dry, and dishevelled. Most prominent of all symptoms was the marked death-like pallor of the mucous membranes of the mouth, gums, and eyelids. The animal's condition appeared hopeless.

Assuming that the most rational form of therapy would be that which would combat the destruction of the hematological elements by the naphthalene, it was decided to employ a highly concentrated liver preparation. Since there had probably been great interference with gastrointestinal absorption, it was decided to use also an injectable preparation instead of depending solely upon peroral medication. For this reason 1cc of pernaemon forte[1] was injected intramuscularly. In addition, 200cc of a 10% glucose-saline solution was administered subcutaneously and intravenously to maintain blood pressure and afford added nutrition. On the chance that assimilation from the intestine might take place to some extent, concentrated liver and iron (ferrous sulphate) capsules were given orally, twice during the day.

On the following day, the dog was more alert and the temperature rose to 100.5° F. At this time, another 1cc injection of pernaemon forte was administered, and in addition liver and beef broth were fed by force. Oral liver concentrate and iron were again given in capsule form twice during the course of the day. After two days of hospitalization, the temperature was normal, the appetite returned, and the animal was much more active than on the previous day. At the owner's request, the animal was discharged without further treatment, attention to adequate nutrition being advised. Five days after discharge (January 23rd), the animal was submitted for a check-up, at which time the mucous membranes had attained an almost normal, pink tint. The owner reported that the animal showed a perfectly healthy appetite and otherwise acted normally. Subsequent examination 12 days later (February 4th), indicated that the mucous membranes were entirely normal, the animal was perfectly alert, and recovery from a serious form of poisoning was complete.

Comments.—Napthalene is a coal-tar hydrocarbon which is quite insoluble in water, but dissolves in alcohol and ether. Upon absorption, the substance has been found to be less toxic to herbivora than to carnivora. According to Solis-Cohen, dogs appear to be less sensitive to the poison than cats. A closely-related compound, betanaphthol, is fatal to dogs in doses of 15gr (1gm) per kg, and cats die in convulsions after swallowing only 1½gr (0.1gm). It has been estimated that the fatal dose of naphthalene is approximately that of betanaphthol. Symptoms vary considerably according to the species. For example, rabbits suffer with diarrhea, dysuria, and convulsions. Cats evidence sneezing, salivation, lacrymation, vomiting, diarrhea, dyspnea, spasms of the facial muscles, and twitching of the limbs. Dogs show a similar train of symptoms, but convulsions are rare and there is greater tendency toward renal irri-

[1] Pernaemon forte is a highly concentrated, purified, injectable liver extract produced by the Roche-Organon Laboratories of Nutley, New Jersey.

tation with subsequent hematuria. At times, there is involvement of the lens (opacity) and retina (hemorrhagic retinitis).

In the present case, it appears that the symptoms to some extent resembled those of benzine poisoning, since degenerative changes in the blood elements were prominent by the time the animal was first seen. It is quite likely that the blood-forming organs were temporarily injured.

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Leucemia in a Dog

Leucemia is defined by Hutyra and Marek as "a general systemic disease associated with unlimited multiplications either of the lymphadenoid or of the myeloid tissues, resulting in enlargement of the leucocyte-forming organs, increase of the white cells (sometimes at the expense of the red corpuscles) of the blood, and the appearance of immature and pathological types of leucocytes in the blood stream."

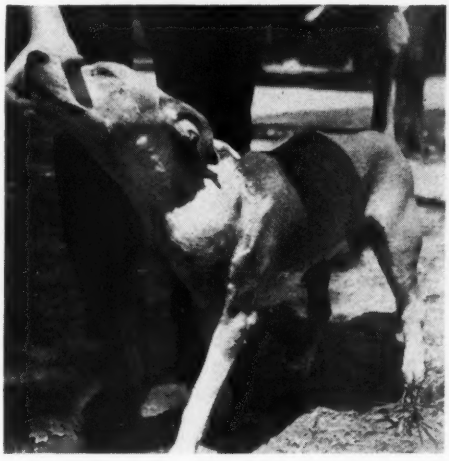
Apart from the leucemia of cattle, which occupies a special category, leucemia is relatively common in dogs, rare in pigs, still more rare in horses and in cats, and hardly ever affects sheep and goats. It is preëminently a disease of adult and aged animals. In the case of dogs it is found most commonly in males, according to Hutyra and Marek.

Little is known of the etiology of mammalian leucemia. It is thought by some to be of a toxic infective origin; however, this is by no means proved.

The differential diagnosis of the two types of leucemia (myeloid and lymphoid) is not so difficult as one might suppose. In the lymphatic form the blood picture is characterized by an increase in the lymphocytes, both typical and atypical in form. The lymph glands are enlarged to a greater extent than in myeloid leucemia. In the myeloid form there is an increase in blood cells of the granulocyte series, and on necropsy the spleen is found to be greatly enlarged.

Clinical Record

July 15, 1940, a dog nine years of age was presented at the City Veterinary Hospital of Tulsa, Okla., for examination and treatment. Swellings of the lymph glands had begun to appear three months previously, but it was not until an edematous condition developed that veterinary advice was sought.



The patient described in this report

Clinical Observations.—The temperature was 103.8° F., the pulse 68, and respirations 30. The suprascapular, prefemoral, inguinal, popliteal, submaxillary and mesenteric lymph glands were enlarged, enlargement of the latter being determined by abdominal palpation. There was considerable edema along the sternum and extremities of the body. The white blood cell count was 56,040, the red blood cell count 6,634,000. The differential white cell count was as follows:

Segmenters (heterophile granulocytes)	45%	(normal 68.5%)
Basophiles	0	(normal 0.2%)
Eosinophiles	6%	(normal 4.1%)
Lymphocytes	43%	(normal 20.6%)
Monocytes	6%	(normal 3.6%)

A diagnosis of lymphoid leucemia was made, and euthanasia was recommended.

Post-Mortem Findings.—The dog weighed 29 pounds. The enlarged spleen weighed one pound. The liver was greatly enlarged, weighing two and one-half pounds. The suprascapular lymph glands weighed one-half pound each. The mesenteric and mediastinal lymph glands were likewise greatly enlarged.

Comments.—The blood picture and the enlarged lymph glands definitely indicated that this was a case of lymphoid leucemia. The edematous condition was probably due to the enlarged mediastinal lymph glands, which finally became large enough to inhibit the proper action of the heart.

LEROY ATKINSON, K.S.C. '41

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Abstracts

Chronic Selenium Poisoning (Experimental)

To study the effect on Equidae of long-continued feeding of selenium in inorganic form, small daily doses of sodium selenite were administered in the feed to three horses and a mule.[77] The animals were apparently in good health when the experiment began. The work was carried on in 1937 and 1938 at the Animal Disease Station, Beltsville, Md.

At the beginning of the experiment a measured quantity of solution of sodium selenite was added to the oats at the rate of 24 parts of selenium per million of the total ration for two horses and 17.3 parts per million for the mule. The animals ate the selenized oats readily at first, but after about two months refused them and ate only hay. The sodium selenite solution was then given as a drench for about four months, when the quantity of selenium was doubled, making a level of 48 p.p.m. for the horses and 34.6 for the mule. About four months later, because of difficulty in drenching the horses, the mule having died in the meantime, the method of administering the sodium selenite was changed so that the solution was diluted and sprinkled on both the oats and hay. The level of selenium was raised to 96 p.p.m. of feed for the two horses about 15 months after the beginning of the experiment. A month later a third horse was placed on experiment and immediately given approximately 115 parts of selenium per million parts of feed daily.

The mule survived for only 6½ months after selenium feeding began, but one of the horses lived about 17 months and another 17½ months. The third horse, which received the highest level of selenium at the beginning of the experimental feeding, lived only about five weeks. The principal symptoms of chronic selenium poisoning exhibited by these animals were emaciation in spite of a fairly good appetite, listlessness, looseness of the hair of the mane and tail, and softening and scaling of the horny wall of the hoof. None of these symptoms, however, were so outstanding as those described in cases of chronic poisoning which occur under natural conditions. The lesions observed in the heart, liver, spleen, and kidneys at necropsy resembled those described in field cases, to a large extent. The authors were not able to account for the failure of the classical clinical symptoms to develop.

[77] Miller, W. T., and K. T. Williams, 1940. Effect of feeding repeated small doses of selenium as sodium selenite to equines. *Jnl. Agr. Res.* 61:5, pp. 353-368.

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Virulence and Transmission of Str. Agalactiae

Suspecting that streptococcic mastitis has an environmental origin, Klimmer and Haupt[81] tried to show in their experiments that strains of *Str. agalactiae* may proceed from latent inflammation of the udder. These strains have a different grade of virulence and they are usually weaker than the organisms observed in clinical cases of mastitis. The virulence and the variable resistance of udder tissue play a great part in the development of mastitis. Parenchyma infection with *Str. agalactiae* has been observed on post-mortem examination of cows that had never shown any sign of infection. These organisms were found also in primiparas and in virgin heifers. These facts support the opinion that streptococcic mastitis may originate from outside the udder.

The same authors have studied the development and transmission of mastitis in a large herd of cows. The possible hereditary transmission of mastitis is still uncertain. The infection has an unfavorable effect on the production of milk, with respect to both average monthly production and duration of lactation. Injections of entozon at the end of lactation were successful. During pregnancy entozon injections gave good results in 31.5% of the cases, was probably beneficial in 10.7%, and was of no value in 57.8%. The figures for non-pregnant animals were 47.3%, 33.7%, and 19%, respectively.

[81] Klimmer, M., and H. Haupt, 1938. Sur la virulence des souches de *Streptococcus agalactiae* des mammelles sans signes cliniques de suspicion. *Berl. Tier. Wochenschr.* 20; Sur le traitement de la mammite streptococcique. *Arch. Wissen. u. Prakt. Tierheilk.* 73:2. Abst. in *Rec. de Med. Vet.* 105:6, pp. 363-364.

Treatment of Diarrhea

The author[81] deals with the classification of diarrhea and the different methods of diagnosis. He lists three main classes: functional, dyspeptic, and due to intestinal lesions. He then discusses the curative properties of basic salicylate of aluminum oxide, its dosage and administration, advising from two to four grams for dogs in cold rice water three times daily; for horses and cattle, from 10 to 30 grams a day; and for calves, from five to 20 grams.

Preneron tries to answer the question whether any kind of diarrhea should be treated. He concluded that when abnormal fecal discharges are a means of defense of the organism against intoxication (renal, hepatic, cardiac insufficiency) the diarrhea should be allowed to continue. The cause should be carefully studied and treatment directed to relief of the basic ailment. In other cases the diarrhea should be treated. For this purpose the author finds salicylate of aluminum oxide to be the most satisfactory agent.

* * * *

Blood Transfusion in Horses

The author[82] performed 25 blood transfusions with a German apparatus (Neoathrombit). The amount of transfused blood varied from 4 to 4.2 liters. With the new apparatus there is no danger of coagulation, the transfusion may be performed very quickly, and the amount of blood transfused may be controlled constantly.

The blood typing test may help in determining the right donor. Thanks to the centrifuge and to citrate of sodium, one may have an answer in 15 minutes, instead of four to eight hours as formerly.

In 21 cases there were no reactions. In four cases general reactions of the animal were observed; marked unrest, decrease in the pulse and respiration, perspiration, incoordination of muscles and of the hind legs. In these cases the red cells of the donor were coagulated by the serum of the receptor. In cases of compatibility, there is a slight increase in the pulse rate and blood pressure for three to six hours, and also a slight rise of temperature. A little yellow spot is observed in the conjunctiva in cases of incompatibility.

The composition of the donor's blood is little changed after the transfusion. When there is compatibility the number of red blood cells and the hemoglobin increase after half an hour; in cases of incompatibility, a slight decrease may be observed. Leucocytes reach their highest peak after six hours. Twenty-four hours later they are again normal.

In four cases the therapeutic effect of blood transfusion was very satisfactory.

* * * *

Treatment of Chronically Lame Horses by Alcoholization

Alcoholization of the nerves, like surgical resection, is not a curative treatment.[83] By suppressing pain, they allow the further utilization of the affected animals until the injured nerves heal or the animal has to be discarded because of the progress of the original ailment. Alcoholization has a remarkable advantage over resection. It keeps inviolate the anatomic continuity of nerves and further leaves the tactile fibers unharmed. This latter is particularly useful in the case of saddle horses. Therefore, in young, valuable animals alcoholization should always be preferred to neurotomy, which usually ruins their career.

Transdermic alcoholization of the plantar nerves may be accomplished easily. It affords confirmation of a correct diagnosis, showing the site of the lesion by immediately diminishing the laming defect. Only in exceptional cases is complete healing achieved. Transdermic alcoholization of the sciatic nerve may give very good and lasting results. Open alcoholization of the median nerve is very reliable and gives complete relief in a remarkable ratio, similar to that following surgical resection.

[81] Preneron, Jean, 1937. Contribution à l'étude des diarrhées. Leur traitement par le salicylate basique d'alumine. Thesis, Toulouse. Abst. in *Rev. de Méd. Vét.* 91, p. 297.

[82] Koch, J., 1938. Sur la technique de la transfusion du sang chez le cheval, avec consideration sur la compatibilite du sang du donneur. *Arch. Wissen. u. Prakt. Tierheikunde* 73:4, p. 266. Abst. in *Rec. de Med. Vet.* 105:7 (July, 1939).

[83] Aujean, M., 1937. L'alcoolisation des nerfs des membres du cheval dans le traitement des boiteries chroniques. Thesis in Veterinary Medicine, Paris. Abst. in *Rev. de Path. Comp.* 39:511, p. 396.

Identification of Dogs by Nose Prints

Nasal impression is still the best method for identification of dogs.[84] It is permanent, individual, and does not require any manual intervention. It may be used for young dogs from four to six weeks of age. The procedure is simple and may be accomplished by anyone. Impressions may be easily grouped and classified, and differences are easily ascertainable.

Eighty-four classes of nose prints divided into two series (male and female) are based upon the medial line and the bottom of the nasal impression. Other classes are determined according to particular signs observed on the medial line (obstruction, stricture, blots) and to the direction of the lines of the central part of the top. New series may be established by considering the forked or concentric secondary lines, and the size and shape of blots. The impression may be included in the pedigree or any kind of certificate. Such identification renders fraudulent substitution in this field readily detectable.

* * * *

Ovariotomy in Mares

Twelve mares were subjected to the operation.[87] One of them was affected by nearly constant nymphomania and eleven were vicious, apparently not in all cases following sexual excitement. No food was administered for 24 to 48 hours preceding the surgical intervention. Before the operation 10 to 20 grams of 10% chloral hydrate was injected intravenously, and 12 to 20cc of a 1% procaine solution epidurally. Anesthesia of the mesovarium was satisfactory in all animals. The operation was performed with the animal in the standing position. The incision was dorso-vaginal. No previous washing was done.

The results of the ovariotomies were as follows: The nymphomanic mare improved slightly. Six of the 11 vicious animals improved greatly, the bad disposition being completely overcome in two of them. In the remaining five mares the condition was unchanged.

The usefulness of such animals after the operation is largely dependent upon the way they are treated. They must be dealt with very gently at first; otherwise the success of the intervention may be greatly lessened.

* * * *

Endocarditis in Domestic Animals

The author[88] reports his studies on 350 cases of endocarditis. Primary localizations were distributed as follows in the different species:

	In Left Side	In Right Side	Origin Unknown
Horses	67%	27%	6%
Cattle	32%	62%	6%
Swine	92.4%	7.6%	.....
Dogs	86.1%	4.4%	9.5%

Mitral and tricuspid valves were more frequently affected than the semilunar valves. In ulcerous endocarditis, aortic valves are as frequently involved as the mitral. Warty endocarditis is the most frequent in domestic animals and generally shows a malignant course, with exceptional cases of healing.

The author was unable to explain the greater frequency of right endocarditis in cattle. He suggests the possibility of an embolic origin, in which the small size of the right coronary artery in this species may play a part.

Cardiac sclerosis in dogs is probably an aftermath of endocarditis. The acute attacks of the disease in young animals produce no macroscopic lesions, but they may be detected on microscopic examination (thickening of the connective tissue).

The most frequent etiological agents of endocarditis are, in order: streptococci, diplococci, *Corynebacterium pyogenes, B. pyosepticus,* staphylococci. Tubercle bacilli have never been isolated as etiological agents. Toxins do not provoke endocarditis, but may predispose the endocardium to a successful bacterial invasion.

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[84] David, L. A., 1938. De l'identification dans l'élevage du chien. Sa technique. Son utilité. Sa necessité. Thesis in Veterinary Medicine, Paris. Abst. in *Rev. de Path. Comp.* 39:511, p. 397.

[87] Okljesa, B., 1940. Ovariotomija kod kobila. *Vet. Arhiv.*, p. 517.

[88] Schornagel, H., 1936. Endocarditis. *Tjidschr. f. Diergeneesk* 63, pp. 67 and 143. Abst. in *Rev. de Path. Comp.* 39:512, p. 479.

Influence of Ingested Minerals on the Fat Content of Milk

Three experiments on cows were carried out by Krizenecky, showing that increasing the amount of calcium, magnesium, and phosphorus in the feed increased greatly the fat content of the milk.[89] Black and Roy Voris observed a positive correlation between the fat content in milk and its content of calcium, magnesium, and phosphorus. He ascribed this to an increase of the same minerals in the metabolism of the mammary glands. Administration of these three minerals was shown to have this effect even during the spring, when the "green food" is not so rich in fats. The advantage presented by the method is that the increase in the percentage of fats does not influence the amount of milk produced by the animals and does not require any change in the quantity and quality of the food. Therefore the administration of minerals is economically advantageous.

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Gaseous Gangrene of Genital Origin in Pregnant Cows

Two cases of gaseous gangrene of genital origin prior to any obstetrical intervention were observed in cows and successfully treated.[86] No bacteriological examination was carried out, so that the etiologic agent could not be determined. Prat thinks that the affection described should be considered a bacterial infection and included in the classification of gaseous gangrenes.

The toxic infection followed the death and putrefaction of the fetus, the symptoms appearing before any intervention was attempted. The infection seemed to be of extraneous origin and localized first in the uterus, thence extending to the placenta and fetus, which played the part of culture medium for the microbic invaders. Toxins spreading in the organism provoked a real intoxication.

These observations show that there may exist a toxic infection of uterine origin prior to and independent of any obstetrical intervention. These infections may be successfully treated with antigangrene serum. The serum used by the author was a polyvalent serum obtained by mixing monovalent serums procured from animals hyperimmunized against the following organisms: *Clostridium chauvei, Cl. septicum, Cl. welchii,* and *Cl. oedematiens,* these serums being used in the following proportions: one-third, one-third, one-sixth, and one-sixth, respectively. This gave excellent results in the treatment of the two cases described. This constitutes a remarkable progress; only a few years ago the prognosis of gangrene was always unfavorable and death almost invariably followed, usually two or three days after the appearance of the first symptoms.

* * * *

Vitamin C and Barlow's Disease in Dogs

Barlow's disease caused by lack of vitamin C is very frequent in young dogs as well as in children. The animal often shows symptoms similar to those of rickets and cries out when it is touched, especially near certain bones; e.g. the lower part of the radius or the upper third of the tibia. Lack of vitamin C is a definite cause of such trouble. The vitamin level of the animal may be measured in the urine by the decolorizing effect of a sample, acidified by glacial acetic acid, on a measured solution of dichlorophenol-indophenol. This reagent, blue in an alkaline medium and pink in an acid medium, loses its color in the presence of vitamin C.

Barlow's disease may be successfully treated by administration of large doses of vitamin C, such as is to be had in lemon juice or in one of the commercial products widely used in practice. The progress obtained by such treatment may be followed easily by testing the urine from time to time and so measuring its vitamin C content.

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[89] Krizenecky, Jaroslav, 1940. Untersuchungen ueber die Beeinflussung der Milchfettproduktion durch Mineralstoffe. *Tierarz. Rundsch.* 46:37, p. 419.

[86] Prat, M. J., 1939. Gangrene gazeuse d'origine genitale chez la vache en état de gestation. Avortement consecutif. *Rev. de Méd. Vét.* 91, p. 305.

[92] Gregoire, C., 1938. La vitamine C et la maladie de Barlow chez le chien. *Ann. de Méd. Vét.,* p. 366. Abst. in *Rec. de Med. Vet.* 105:8, p. 483.

Book Reviews

History of Pharmacy. *By Edward Kremers,* Ph.G., Ph.M., Ph.D., Sc.D., former Director, Course in Pharmacy and Professor of Pharmaceutical Chemistry, University of Wisconsin; and *George Urdang,* Ph.G., D.Sc. Nat., former Director of the Society for the History of Pharmacy, former Editor of the *Pharmazeutische Zeitung,* Honorary Member of the American Pharmaceutical Association. Cloth bound. 565 pages, illustrated. J. B. Lippincott Company, Philadelphia, 1941. $4.50.

Those who enjoy wandering in the realm of medical history will be thrilled by the first glance at this chronicle of the apothecary's art, written by authors well qualified for the task. In tracing the origin of pharmacy no farther back than some apothecary shop of an ancient people the authors, however, do an injustice to the antiquity of their own art. The Ebers Papyrus (1500 B.C.) and the painting of the Egyptian Ointment Kitchen found in a tomb of the 18th dynasty (1400 B.C.) may be the earliest pharmaceutical records extant, but much earlier than this sacerdotal treatments are recorded which surely required the use of medicine which must have been prepared somewhere by someone's handicraft. The Assyrians had developed quite a system of medicine for men and animals as early as 2,200 years before the Christian era. Such a system implies the co-existence of some form of pharmacy; and since in ancient times the evolution of such practices was slow, it is not far-fetched to reason that the doctors had their drugstores (or something similar) far back into the legendary ages.

In our own studies of veterinary-medical history we have been, however, content to omit the medicine of Assyria and Egypt and take up the chain with the Arabian conquest, following through with the veterinary contemporaries of Galen who flourished in the military organization in the early centuries of this era up to the sack of Rome and thence through Dark Ages to the veterinary doctors of the Renaissance. Running parallel was the splendid agricultural medicine and chemistry of the Arabs, who left the voluminous veterinary literature (which now lies in the museums of Berlin, Munich and Paris) as evidence that medicines of vegetable, animal and mineral origin were even then prepared and used on a large scale. Pharmacy? Well, the long lists of drugs employed must have been made in some sort of shop by men more or less skilled in the pharmaceutical art. Not a few of these drugs are still found in the modern pharmacopoeias.

The historical compilation of Kremers and Urdang fits beautifully into what we believe is authenicated veterinary-medical-pharmaceutical history of the same periods, a history that the present scientific world is only beginning to understand, thanks to authors who give us such books as the *History of Pharmacy.*

Quoting from the preface: "The history of pharmacy is replete with inspiration for the useful disciple. . . . Important as this aspect may be, it is perhaps equally important that the pharmaceutical practitioner knows the past in order that he may understand the present and plan intelligently for the future." It is unfortunate in all the professions that such a brand of wisdom is not more generally heeded by the practitioners.

The pharmacy of 1941 first took form in Italy, a throwback to Galenic medicine which not even the Dark Ages could destroy through 15 centuries of domestic strife, crumbling nations, and cultural decline. Italy is the cradle not only of pharmacy but of all modern medicine. Medicine and pharmacy were always and are now as inseparable as the artisan and the tool maker, and the centuries have made them more and more dependent one upon the other. Their kinship, however, was never any too amicable. They have quarreled continuously and at times less politely than at present. An example of the longevity of the druggist-doctor quarrel is shown by the attitude of the American Medical Association when at the Chicago meeting in 1877 Dr. E. R. Squibb was permitted to read his paper only after breaking down a bitter opposition. The druggist has wanted to treat the sick and the physician to sell drugs. Each has wanted the other to "stick to his last," of

which there is no better example than the present-day operations of veterinary medicine.

Emulating the Italian school, France was the first to make pharmacy a learned profession. As the dark ages were clearing the fight between medicine and pharmacy was bitter, the apothecary having the upper hand. The pharmacist was a veritable threat to the physician. For many years there were recognized pharmacist-physicians. The sick flocked to the drug store, and to retaliate the physician practiced pharmacy, or, to further damage the drug trade, they taught the people to make their own medicine, by means of widely circulated instructions. Printed directions on drug making were distributed among the public to "put the druggist in his place." Some of this literature was translated and distributed by the physicians in other countries. The *herboristerie* (herb shop) of France today as distinguished from the *apothicairerie* (pharmacy or drug store) are the remains of this controversy. Early English writers on veterinary medicine were "veterinary chemists" or publishers rather than practitioners. Markham never practiced, but achieved a very considerable income from the flood of books from his pen; Morgan was a lawyer, De Gray a wealthy gentleman of leisure, Lower, Bracken and Willis were physicians who prepared a line of veterinary remedies, Taplin was a surgeon whose principal business was the sale of drugs and Hinds was a "chemist" (pharmacist).

Pharmacy in Germany dates back to the Middle Ages. It was always regulated by the government and was already highly developed in the 14th century. Contrary to the situation in France where the apothecaries were accused of charging exorbitant prices, as early as 1240 Frederick II set the price to be charged for medicines. The achievements of German pharmacists is obviously the result of this early governmental interest in the production of medicines.

In England, pharmacy was a neglected art. Though somewhat advanced in Scotland in the 18th century, there were no professional standards set up for pharmacists in England until the 19th century, or many centuries after the art had been highly developed on the continent. The practice of medicine, however, was regulated by law early in the 16th century. The Royal College of Physicians, founded in 1518, was given power to supervise the apothecaries, distillers and sellers of drugs, and chemical medicines, yet the *laissez faire* attitude toward pharmacy remained for many years thereafter. Irregular physicians (mostly pharmacists) were tolerated, and "chemists" (druggists) monopolized the drug trade well into the 19th century. The College of Physicians emphasized the abuses as late as 1841 but it was only in 1933 that the titles of druggist, pharmacist and chemist were protected by law!

It is, therefore, quite understandable why medicine lagged among the American colonists and "yarb doctors" existed in backward communities down to the beginning of the present century, if indeed they do not still flourish under the more grandiloquent designation of proprietary medicine manufacturers. Advances made in Canada by the French pioneers were interrupted by the ceding of that country to England (1762) and by the Louisiana Purchase in 1803.

The first American drugstore may have been that of Dr. Gysbert van Imbroch in New Amsterdam (New York), who kept a "shop." If this was a surgeon's or barber shop rather than a drugstore, then the credit goes to Kingston (then called Wildwycks) where there was a drugstore in 1699, supposedly the first one in North America. Hans Kiersted who came from Germany in 1638 may have had a drugstore in what is now New York City since he left a number of prescriptions which were handed down to his descendents, many of whom have been identified with the medical profession. His great-great grandson, Gen. Henry T. Kiersted of Harlem was twice president of the American Pharmaceutical Association (1860-62). At his well-known drugstore on Broadway he sold "Kiersted Ointment" made from a 200-year-old recipe by Hans. New York and Philadelphia newspapers of the 18th century carried advertisements of

apothecaries. The publications of Benjamin Franklin advertised drugs and told how to use some of them. By 1721 there were "14 apothecary shops in Boston." It was, however, not until the 1750's that druggists began to fill physicians' prescriptions. The relative duties of druggist and physician were, therefore, unsettled among the American colonials.

With the coming of American independence there emerged as many new nations from the standpoint of local government as there are states in the Union, each free to regulate its own druggists, chemists and physicians, under laws and rules too numerous and too complex for this review. The authors describe these in the chapters on "The Rise of Legislative Regulation," and "The Growth of the Associations," both of which can be read with a great deal of profit by all men engaged in professional work, for therein lies the body and soul of the medical and allied professions, the regulation of which is the task of the several states except where actual matériel (not knowledge) is transported beyond state boundaries.

The history of the private schools of pharmacy is similar to that of the veterinary educational system that grew up from necessity when the makers of the federal set-up left so many matters vital to public welfare in the hands of undeveloped commonwealths too inexperienced to fathom the needs of an exuberant population. Though long recognized as imperative, no national legislation governing the drug trade was enacted until 1906 (June 30) when the Food and Drugs Act was passed. A law passed by Congress in 1846 provided for the inspection of imported drugs, but this proved unsatisfactory because the inspection was not competent. These laws, including the Harrison Narcotic Act, were attacked as being unconstitutional by commercial groups interested in unrestricted production and sale of food and drugs. The authors, true to their colors, point out that violations of these laws by druggists are few in comparison to the number of physicians, drug peddlers and others brought to trial.

Going back to private schools, complaint is registered that medical schools established courses in pharmacy to serve as "feeders" to the regular medical course and that the teachers were physicians, not pharmacists. In the absence of books devoted to that branch of knowledge (as in France and Germany), pharmacy in England and America has been a "confused and unsystematized art." The private schools, owned and operated by druggists and supported financially by fees of the students, developed pharmaceutical education on precisely the same lines as did the medical colleges [and the veterinary colleges]. No noteworthy change could be expected from the private schools, although these authors should have added that it was the alumni of these schools who founded the associations and developed the spirit which, at a very late day, finally awakened the states to their responsibilities in the matter. The private medical, pharmacy, dental and veterinary schools of the United States were the forefathers of the educational systems each of these professions now enjoy, and developed the personnel which forced the issues and forced the reform. Historians trekking back to the Assyrian Kings for reading matter should not forget the events of yesteryear.

As an economic structure pharmacy is tremendous. From the drugstore of every village and on nearly every other business corner of the cities to the enormous manufacturing laboratories, it represents an investment and a personnel without parallel. The figures given by the authors include many ciphers.

The contributions of pharmacists to science and industry, discoveries and inventions by pharmacists, a long glossary with brief biographical sketches of ancient, medieval and modern men of medicine, a bibliography of 38 pages confirming the text, and a chronological table from 5000 B.C. to date, together with 356 additional pages of interesting material make up a book of the highest order—a book that will add enchantment to any library, but more particularly to the libraries of those engaged in any branch of medical science or practice.

Magic in a Bottle. *By Milton Silverman,* Ph.D. Cloth bound; 332 pages. The Macmillan Company, New York, 1941. $2.50.

This work gives in storybook form the history of the discovery of ten of the more important drugs, their derivatives, and drugs of similar action, with an account of their introduction to medicine, their adoption by the medical profession, and the development of methods of using them. It is written in the popular style pioneered by Paul de Kruif; or rather, in an extremely palatable refinement of that style—dramatic, but never overdramatic; piquantly phrased, but without an effect of undue straining after the picturesque.

In many cases the record is not complimentary to the medical profession. Doctors ridiculed for a decade the advantages of morphine over opium. Although digitalis had been used by the laity for a long period, physicians refused it until its use was forced upon them by quacks. Ether was neglected for centuries after its discovery. And so the story goes. Conservatism has its place and its advantages in medicine, but Silverman seems to have found a good many places where it has worked to the disadvantage of the patient.

In 1799 opium was of uncertain quality. Sometimes it relieved pain as the physician intended it to; sometimes the most heroic doses were without any analgesic effect whatever. Again, it relieved the pain, but the patient never wakened. After being told of a particularly harrowing experience, Sertuerner, a young pharmacist, set about finding the *something* in opium that relieved the pain, the effect of which would be always the same—never too much, never too little. It took him seven years, but the result was morphine. Sertuerner's work was ridiculed or ignored, and morphine was not accepted by the medical profession for over a decade. A few years later, of course, it was "Morphine? We've always had it!" and Sertuerner was allowed to die forgotten and friendless.

In the middle of the 17th century the Countess of Chinchona, sojourning in Peru, was cured of malaria by an old Indian remedy, the bark of the quinaquina tree. Shipments of "Peruvian bark" were received enthusiastically in Spain, and its use quickly spread over western Europe. It soon fell into disrepute, however, partly because it was widely distributed by Jesuit priests, and therefore regarded with suspicion by good Protestants, but chiefly because the medical profession rejected it on the ground that it was not mentioned in Galen's list of good drugs compiled 1400 years before. A quarter of a century later an ingenious opportunist, Robert Talbor, used the bark in concocting a "secret remedy" with which he achieved great success. After he had cured the dauphin of France of malaria, King Louis XIV bribed Talbor with a title, a yearly pension, and a good round sum of louis d'or to divulge the formula to him. (Louis himself had been cured of malaria 40 years before, by plain Peruvian bark; but the memories of princes are notoriously short.) Talbor sold the priceless "secret" to the king, but with the proviso that the formula should not be made public until after his death. Sanctioned by royalty, the "secret remedy" of Talbor became an accepted treatment for malaria; and when, after Talbor's death, it was learned that the formula consisted simply of roseleaves, lemon juice, and Peruvian bark, the medical profession finally consented to admit this drug which was unsponsored by Galen to the medical pharmacopeia. The dead hand of Galen, after 1400 years, stayed the use of the first specific known to medicine although each year tens of thousands were dying from malaria and millions were incapacitated!

Facts like these make good stories. Digitalis, cocaine, salvarsan, aspirin, the barbitals, vitamins and hormones, sulfanilamide —the histories of all these and related drugs are as fascinating, as full of weird errors and brilliant discoveries, of recognition given or capriciously withheld, as those of morphine and quinine. In Silverman's deft hands they lose nothing in the telling.

The stories in the book are worth reading for their own sake; even more so, for the sake of obtaining an enlightened point of view toward medical progress. "Somewhere tomorrow's triumphs are in the making, as fantastic as a fairy tale or as simple as ABC. Someday they, too, will be magic in a bottle,"

says Silverman. If tomorrow's magic is worked into today's scheme with less bungling than has sometimes been the case in the past, part of the credit must go to books like this.

You may obtain any book reviewed in this department by remitting the published price to the Book Department of VETERINARY MEDICINE, 7632 S. Crandon Ave., Chicago, Ill.

The Relation of Diseases in Lower Animals to Human Welfare. *By John R. Mohler, Raymond A. Kelser, and Cassius Way.* Paper bound; 39 pages. University of Pennsylvania Press, Philadelphia, 1941. 50c.

This booklet contains three addresses presented at the University of Pennsylvania Bicentennial Conference, Sept. 16-20, 1940: The Relation of Animal Diseases to Human Welfare, by Doctor Mohler, Chief, Bureau of Animal Industry, U. S. Department of Agriculture; Veterinary Research and Public Health, by Col. Kelser, Chief Army Veterinary Corps, Office of the Surgeon General, U. S. War Department; and Progress in Veterinary Medicine, by Doctor Way.

Doctor Mohler's address is a remarkably clear exposition of the relation of animal diseases to human welfare, and of the steps which have been taken and the policies which should prevail in animal disease control. Col. Kelser outlines the history of veterinary research as it relates to public health, stressing the need for cooperation between veterinary and human medical research. Doctor Way lists the achievements in the veterinary field of outstanding graduates and faculty members of the University of Pennsylvania.

The format of the booklet is attractive, dignified, and in keeping with its contents. The first two discussions in particular should be called to the attention of those who are unaware of the importance of veterinary medicine to the public weal.

Vitamins in Nutrition is the name of a brochure just issued by Merck & Co. Attractively illustrated, it describes the present status of vitamins in general and of the components of the Vitamin B complex, especially in relation to the new "enriched flour," in particular. Written in non-technical language, the brochure has been sent to food processors, including millers, bakers, cereal manufacturers, confectioners, and bottlers.

* * * *

Judy's "Sirius Sentiment Series" has been issued in uniform size (12 cards, four by nine inches).

The series, which includes Senator Vest's "Tribute to a Dog," Captain Judy's "A Dog's Prayer" and "The Dog's Bill of Rights" and similar poems and sentiments on "man's best friend," sells at 10c per card, or the entire 12 for 60c; four complete sets or assorted, $2.00. They can be obtained through bookstores or direct from Judy Publishing Company, 3323 Michigan Blvd., Chicago.

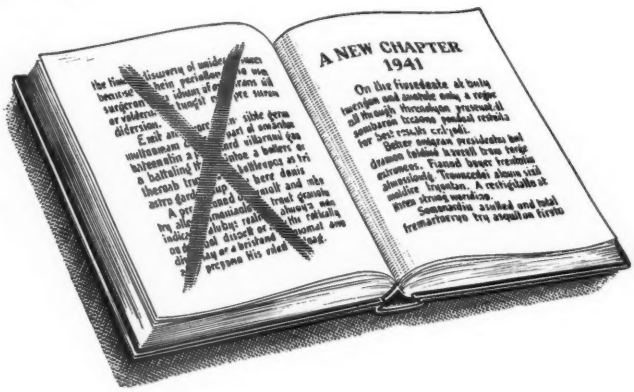
* * * *

Determining the Age of Farm Animals By Their Teeth, Farmers' Bulletin No. 1721, issued by the U. S. Department of Agriculture, describes by words and pictures the determination of the age of the various species of farm animals by the eruption of the teeth or the wear upon these organs.

Establishing the age of farm animals through the appearance of the teeth is no new thing. The possibility of judging in this manner apparently was well known in ancient days. The old saying, "Do not look a gift horse in the mouth," is attributed to Saint Jerome, of the fifth century, who used this expression in one of his commentaries. Certainly for generations the appearance, development, and subsequent wear of the teeth has been recognized as a dependable means of judging approximately the age of animals.

The bulletin may be obtained by addressing the Superintendent of Documents, Washington, D. C.; price, five cents.

Potency Standardization—
A New Chapter in



RABIES CONTROL

WHEN LEDERLE INITIATED STUDIES on the potency standardization of rabies vaccines and subsequently adopted the procedure in production, there was started a new and advanced chapter in the control of the disease. Now with all rabies vaccines conforming to the HABEL potency test by official order, the ultimate goal of 100% protection may be more nearly approached.

There has been plenty of good evidence presented supporting vaccination of dogs against rabies with either the phenolized or chloroformized vaccine. Large field surveys have demonstrated the efficiency of the vaccines in reducing the incidence of the disease—even before the potency standard edict of the U. S. Bureau of Animal Industry went into effect last year.

The veterinarian's position has thus been strengthened. For with a standardized tool at his command he can and should encourage vaccination with greater confidence than ever before.

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One injection method—Phenol killed. (A 20% suspension of tissue virus.)
For active immunization against rabies in dogs.
1—5 cc. vial
6—5 cc. vials
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Lederle
One injection method—Chloroform killed. (A 33⅓% suspension of tissue virus.)
For active immunization against rabies in dogs.
1 dose (5 cc. vial)
6 doses (6—5 cc. vials)
10 doses (50 cc. vial)

(Vaccination tag and certificate with each package)

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You'll Be Interested to Know That . . .

The newest premium offer is that of a "Scizz-Set," which consists of two pairs of scissors in a leatherette case. The Scizz-Set can be obtained by sending Wilson & Co. (4100 S. Ashland Ave., Chicago) the labels from three cans of (you've guessed it) Ideal dog food, plus 25c. . . . The offer is being publicized widely in newspapers, magazines, and on the radio. . . . We have been viewing these various premium offers wistfully, but so far have not got to the point of sending in for one. While the Scizz-Set sounds the best bet since Swift's Pard-Lite, we are still holding out for a set of the Encyclopedia Britannica.

■

Veterinarians prominent in the milk industry include L. J. Tompkins, of Sheffield Farms Co., New York City, retiring president of the Metropolitan Certified Milk Producers, Inc.; and George H. Hopson, who has been associated with the Borden Farm Products Co., and who for the past four years has been milk sanitarian with the Milk Commission, Kings County Medical Society, Brooklyn, N. Y., and closely associated with the Certified Milk Producers' Association of America. Doctor Hopson has recently resigned his position with the Milk Commission to take a position with the De Laval Separator Co.

■

The Colorado University, at its convocation April 28th, conferred the honorary degree of Doctor of Science on Dr. I. E. Newsom, Dean of the Division of Veterinary Medicine and Vice-President of Colorado State College, and Acting Director of the Colorado Experiment Station, Fort Collins, Colo. . . . Doctor Newsom received the B. S. degree from Colorado State College in 1904, becoming an assistant professor of veterinary medicine there the same year. He obtained veterinary degrees from the San Francisco Veterinary College (1906) and the Kansas City Veterinary College (1909), becoming assistant professor of anatomy at Colorado State in 1909 and professor of pathology in 1919. His appointment as Dean of the Division of Veterinary Medicine came in 1934. . . . Doctor Newsom is internationally recognized as an authority on the diseases of sheep.

We note in the Hutchinson (Kans.) *Herald* that Dr. Sam Hayes of that city has acquired the saddle in which he "made his first dollar." Last week he noticed the saddle at the farm home of Mrs. H. O. Graves and asked if it were for sale. "Hank Graves lent me that saddle many years ago at a rodeo," Doctor Hayes recalled. "I had an offer to a cash prize if I'd ride a certain bucking broncho. I borrowed that saddle and won the money."

■

As the clinical and experimental reports on the use of sulfanilamide and related products for (apparently) every ailment under the sun continue to accumulate, we wonder what Dr. Samuel L. Miller thinks about it now. Two years ago he was sufficiently impressed to burst into song in the *J. A. M. A.* to this effect:

THERAPEUTIC INDEX

If your patient has "gc,"
Use sulfanilamide;
If he's water on the knee,
Use sulfanilamide.
If he's bothered by the hives,
Or Echinococcus thrives,
Don't you fret, just busily
Use sulfanilamide.

If little Johnny has a spell,
Use sulfanilamide;
If it's just his feet that smell,
Use sulfanilamide.
If his liver seems to quit,
There's no need to have a fit;
What you need to make him well
Use sulfanilamide.

If you want her to conceive,
Use sulfanilamide;
If it's piles you would relieve
Use sulfanilamide.
If you've fallen down on knowledge,
You don't need to go to college;
For your reputation to retrieve,
Use sulfanilamide.

That was two years ago . . . An up-to-date revision of this opus would be considerably longer. We modestly offer the following stanza for inclusion in it:

For bovine coccidiosis
Use sulfanilamide.*
If your dog has halitosis,
Use sulfanilamide.†
When a wound becomes infected
And slow healing is suspected,
Stop that ominous necrosis—
Use sulfanilamide.‡

* See April *Vet. Med.*, pp. 199-201.
† Probably any day now.
‡ Preferably combined with urea and benzyl alcohol, in solution in propylene glycol (see pp. 300-304, this issue).

An actual field report from Illinois on Cutter B. T. V.

"TODAY THE B.T.V. PIGS AVERAGE AS LARGE AS THE SERUM-VIRUS PIGS, YET THEY ARE ABOUT TEN WEEKS YOUNGER!"

"In the Fall this herd had hog cholera. Everything was given serum and virus, including some eight to ten week-old pigs, but with the exception of some day-old pigs. These latter, along with some which were born within the next few days, were given B.T.V. ten weeks later, and earmarked to distinguish them from the serum-virus treated animals. When I saw this herd today, I found that the B.T.V. pigs average as large as the serum-virus pigs, yet they are about ten weeks younger.

"The smallest pigs in the group were among the serum-virus pigs. Considering that all of these pigs have been running together all of the time, and that the younger pigs never get as good a chance to grow when they feed with older pigs, I think this was quite interesting and remarkable."

Reports such as the above are common. Cutter hog cholera vaccines, B.T.V. and Crystal Violet, not only stop "vaccination stunting," but prevent vaccination breaks and markedly lower losses from secondary infections such as pneumonia and enteritis.

Let your clients market their pigs weeks earlier. Vaccinate with Cutter B.T.V. or Crystal Violet and avoid the grief incident to serum-virus treatment.

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Coming Meetings

Mississippi Valley Veterinary Medical Association, ninth annual clinic, Armory, Galesburg, Ill., May 22.

Massachusetts Veterinary Association, monthly meeting, Hotel Westminster, Boston, May 28.

Veterinary Medical Association of Texas, semiannual meeting, A. & M. College of Texas, College Station, June 10-12.

Oklahoma Veterinary Medical Association, semiannual meeting and veterinary short course, Oklahoma A. & M. College, Stillwater, June 11-12.

Eastern Iowa Veterinary Association Eleventh Annual All-Day Practitioners' Clinic, Dairy Cattle Congress Grounds, Waterloo, Ia., June 17.

Ohio State University 14th Annual Veterinary Conference, College of Veterinary Medicine, Columbus, June 18-20.

Idaho Veterinary Medical Association, annual meeting, Burley, Idaho, June 23-24.

California State Veterinary Medical Association, annual meeting, Hollywood, Calif., June 23-25.

South Carolina Association of Veterinarians, annual meeting, Rock Hill, S. C., June 24-25.

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Minnesota State Veterinary Medical Society, semiannual meeting and veterinary short course, University Farm, St. Paul, June 24-25.

Wisconsin Veterinary Medical Association, summer meeting, Chippewa Falls, Wis., June 26-27.

North Carolina State Veterinary Medical Association, annual meeting, Wrightsville Beach, N. C., June 26-27.

Missouri Veterinary Medical Association, annual summer meeting, Connor Hotel, Joplin, Mo., July 7-8.

Pacific Northwest Veterinary Medical Association, annual meeting, Vancouver Hotel, Vancouver, B. C., July 7-9.

Virginia State Veterinary Medical Association, annual meeting, The Virginian Hotel, Lynchburg, Va., July 9-10.

Veterinary Medical Association of New Jersey, semiannual meeting, Berkeley-Carteret Hotel, Asbury Park, N. J., July 10-11.

Georgia State Veterinary Association, annual meeting, Tosco Hotel, Thomasville, Ga., July 16-17.

■

The dates of Oct. 15, 16 and 17 have been announced for the Purdue University annual Short Course for Veterinarians, Lafayette, Ind.

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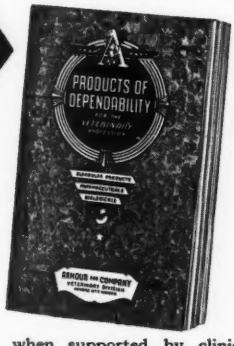

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JUDY'S DOG ENCYCLOPEDIA, complete, with free supplements—all breeds and subjects, $5.00. Dog World, all-breed monthly, $2.00 for one year, $3.00 for two years, $5.00 for five years. JUDY PUBLISHING COMPANY, 3323 Michigan Blvd., Chicago, Ill.

"HORSESHOES OF INTEREST TO VETERINARIANS" by the late Prof. Henry Asmus, Cornell University. This new book on horseshoeing contains 164 illustrations of shoes for both healthy and defective hoofs and for several kinds of lameness, with full description of each. Useful to the general practitioner as well as to the specialist on lameness in the horse. Price $1.00. Address Mrs. Henry Asmus, 7 Reservoir Ave., Ithaca, N. Y.

FOR SALE: Small Animal Practice and Hospital in Southern California. Established 17 years. Owner retiring on account of ill health. Equipment of hospital all modern and new. Cost $7,200. Real estate is worth $7,000. Practice runs $20,000 or upwards yearly. Unquestionably the best veterinary "buy" in the state at $12,500. Address No. 321, care of VETERINARY MEDICINE.

SUMMER POSITION WANTED by Junior veterinary student. Would prefer a mixed practice in New York State or New England. Address No. 319, care of VETERINARY MEDICINE.

WANTED: A young veterinary graduate, as assistant for small animal practice in large midwestern city. Must be single, of neat appearance and willing to work. A splendid chance to go along with the practice. Experience unnecessary. Address No. 328, care of VETERINARY MEDICINE.

FOR SALE: Mixed practice with small animal hospital in midwest city of 40,000. Wonderful opportunity for ambitious man. Reason for selling, other interests. Address No. 323, care of VETERINARY MEDICINE.

FOR SALE: One Fischer & Co. X-Ray outfit with Fluoroscope combined; 40 Model, used less than two dozen times. One imported emasculatome, never used. One microscope with oil immersion lens in No. 1 condition. Address No. 326, care of VETERINARY MEDICINE.

SITUATION WANTED by middle-aged graduate veterinarian. Anything except active practice. Has commercial and editorial experience in addition to 20 years experience in active practice Address No. 324, care of VETERINARY MEDICINE.

POSITION WANTED by 1941 graduate; competent, industrious; 27 years old. Small animal or mixed practice, anywhere in New England, New York, or New Jersey. Address No. 325, care of VETERINARY MEDICINE.

WANTED: Couple, white, for small animal hospital. Two adults in family. Man must be experienced with dogs and like them; grooming experience essential. Wife to do general housework; no laundry. Must have car. Liquor prohibited. Salary $100 month, room and board; extra pay for pickups and deliveries. Address No. 327, care of VETERINARY MEDICINE.

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is a water-soluble sulphur compound which evaporates, leaving the sulphur directly on the surface where wanted. It is miscible in many oils. Uniformly satisfactory in the treatment of practically all forms of parasitic skin diseases where sulphur therapy is indicated, such as sarcoptic mange, itch, dry and moist eczema and the lesser forms of skin diseases. Contains no cresylic acid, coal tar or creolin; hence is safe for cats and other animals susceptible to such poisons. About 95% deodorized; generally leaves no objectionable odor on household pets. Guaranteed by SULPHUR PRODUCTS CO., Greensburg, Pa.

Army Veterinary Corps

Appointment.—1st Lt. Harry John Robertson, Veterinary Corps Reserve, as first lieutenant in the Veterinary Corps, Regular Army, with rank from April 22, 1941; assigned to station at Mitchell Field, N. Y.

Transfer.—Capt. Harry B. Roshon, from Fort George G. Meade, Md., to the 29th Division, at that station.

Promotion.—To Major: Capt. Arvo T. Thompson, April 8, 1941.

Veterinary Corps Reserve

Transfers.—Capt. William E. Eggert, Jr., from New York Port of Embarkation, Brooklyn, N. Y., to Front Royal Quartermaster Remount Depot, Front Royal, Va., May 5; Capt. Harry G. Geyer, from Headquarters, Fifth Corps Area, Fort Hayes, Ohio, on completion of temporary duty at the Army Medical Center, Washington, D. C., to Quartermaster Remount Depot, Fort Reno, Okla.; Capt. Donald C. Kelly, from Fort Bliss, Tex., to Ladd Field, Alaska; 1st Lts. Jack R. Knappenberger, from Fort Robinson, Nebr., to Troop B, 252nd Quartermaster Squadron, at that station; Arthur B. Christian, from Camp Claiborne, La., to Fourth Corps Area Service Command, with station at the West Palm Beach Air Base, West Palm Beach, Fla., May 1; Clifford N. Decker, from 3rd Cavalry Brigade, Fort Riley, Kans., to Chicago Quartermaster Depot, May 5; Rowland W. Rushmore, from Fort Benning, Ga., to Army Medical Center, Washington, D. C., May 15; to the Philippine Department, sailing from San Francisco April 21, Capt. Oliver W. Orson, from Fort Bliss, Tex.; 1st Lts. James G. Anderson, from Fort Slocum, N. Y.; Herbert I. Ott, from Camp Blanding, Fla.; Burton C. Thomson, from Fort Bragg, N. C.; Clayton H. Mickelson, from Stockton Field, Calif.

Promotions.—To Lt. Colonel (temporary): Maj. Archie Lee Faulk, April 4; to Captain: 1st Lts. Harry George Geyer, March 29, and Samuel Edward Grove, April 22.

Ordered to Extended Active Duty. — Maj. Robert Sarde, to Army Veterinary School, Army Medical Center, Washington, D. C.; 1st Lt. Thomas W. Garrett, to Fort Mason, Calif.; 1st Lt. Leonard J. Abell, to Fort Reno, Okla.

Meat Inspection Course.—The following officers, now on active duty, are ordered to report at the Chicago Quartermaster Depot April 28, 1941, for a 30-day course of instruction in the inspection of meat, meat-food, and dairy products: Maj. George S. Mechling, Camp Shelby, Miss.; Maj. William H. Shannon, Camp Edwards, Mass.; Capts. J. Lavere Davidson, Camp McCoy, Wis., Charles H. Elliott, Camp Livingston, La., Robert M. Parker, Camp Shelby, Miss., Alfred C. Zedlitz, Fort

Sam Houston, Tex.; 1st Lts. Clifford H. Milks, Westover Field, Mass., Martin G. Lorber, Fort Devons, Mass., Walter J. Fallon, Plattsburg Barracks, N. Y., William S. Monlux, Camp Upton, N. Y., Robert L. Alkire, Fort Eustis, Va., LeRoy T. Fisher, Camp Croft, S. C., Ray M. Bachelder, Fort Benj. Harrison, Ind., Raymond L. McMahan, Fort Knox, Ky., Stanley L. Hendricks, Fort Sheridan, Ill., Harold B. Mills, Camp Wolters, Tex., William E. Niemeyer, Los Angeles, Calif., William W. Williamson, Fort Stevens, Oregon, Marion J. Jones, Fort Riley, Kans.

■

State Board Examination

The Kansas Board of Veterinary Examiners will meet at Manhattan, Kans., on May 21. Inquiries should be addressed to Dr. Thos. P. Crispell, Exchange Building, Parsons, Kans.

The Alabama Veterinary Medical Examining Board will meet in the Veterinary Building, Auburn, Alabama, May 30 and 31.—I. S. McAdory, Secretary-Treasurer.

The Oklahoma Board of Veterinary Medical Examiners will hold their next examination July 1 and 2 at the State Capitol Building, Oklahoma City, Oklahoma. W. C. McConnell, Holdenville, Okla., is Secretary-Treasurer.

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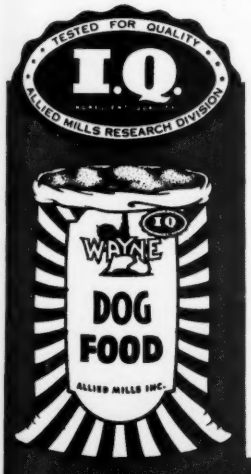

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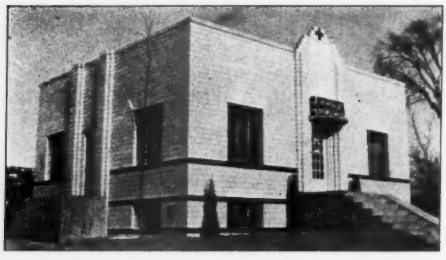

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Trial Order—one dozen boxes (once only) .....$ 8.00
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California Acts to Eliminate Substandard Biologics

The California State Department of Public Health announces that an immediate survey of conditions affecting the potency of serums, vaccines and anti-toxins used in the prevention and treatment of diseases affecting humans (diphtheria, smallpox, scarlet fever, etc.) and live stock (anthrax, hog cholera, blackleg, canine distemper, Bang's disease, *et al.*) will be made by its Bureau of Food and Drug Inspection.

Pointing out that lives depend upon the efficacy of these materials, the Department has sent circular letters asking assistance in enforcing the law to all city and county health officers, agricultural colleges, organizations of live stock breeders and cattlemen, agricultural commissioners, live stock inspectors and doctors of veterinary medicine.

The law provides that all serums, vaccines, and anti-toxins must be manufactured in laboratories licensed by the United States Public Health Service, the United States Department of Agriculture, or the State Department of Public Health.

Emphasis on proper storage is made by the State Department of Public Health, which warns that smallpox vaccine must be kept below freezing to be effective, while most other vaccines must be kept at temperatures above freezing but below 41°F.

MIDDLESEX UNIVERSITY
School of Veterinary Medicine
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Dean of the School of Veterinary Medicine

New U. S. D. A. Poster

To aid dairymen in combating bovine mastitis the U. S. Department of Agriculture has issued a poster on the subject. One of the simplest methods of detecting the presence of mastitis, is the use of the so-called "strip cup," is depicted on the poster. The text presents briefly the cause, prevention, and treatment of mastitis, together with other pertinent information.

The poster, printed on light cardboard, measures 16 by 20 inches. Copies may be obtained free, as long as the supply lasts, by applying to the Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

■

Dogs Are Part of Armies Now

Dogs for use in war are now being trained all over the world. Russia has its school for dogs in Moscow; in Japan a training kennel has been functioning since 1933. In Poland and Italy kennels for war dogs have been common.

The dogs are trained to carry messages, for the medical corps and for guards. To reach their destination they will travel fast over rough terrain and swim across rivers. They go to find medical corps men when they have located the wounded. If the end of a telephone wire is attached to the collar of a military dog he will lay the wire more quickly and more silently than can men; he will carry supplies on his back and can also work with a gas mask.

Since remotest history dogs have been used in campaign and for the defense of towns. According to Plutarch, dogs in an outpost saved a Corinthian garrison. Roman dogs guarded the ramparts. The Celtic dogs were trained to leap at the nostrils of horses. In the Middle Ages Scottish troops had dogs; so did the Knights of Rhodes. In 1799 Napoleon recommended to Marmont the employment of dogs to help guard Alexandria. In 1870 the Germans made great use of dogs to protect their marches, to guard cantonments and bivouacs and for liaison agents.

In 1914 the German army had 600 trained dogs and thousands of civilian dogs were requisitioned during the campaign. The French Minister of War recognized their usefulness and General Lyautey organized a special service. Some 9,000 dogs were recruited, assembled in Paris, classified for aptitude, and sent to training kennels. The dogs rendered valuable services; many are the tales of their exploits.—*Armour's Magazine*

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Dr. Naylor Dilators fit either large or small teats without overstretching or tearing, are easy to insert and stay IN the teat. They carry antiseptics and healing agents into teat canal to combat infection and promote healing. The dilators themselves are Medicated, Soft, Absorbent dressings which protect the inflamed area, absorb inflammatory exudates and keep teat canal open in its natural shape while tissues heal.

Price to Veterinarians

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Fifty Cent Package (contains 18 Dilators)..... 4.00 Per Doz.
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Deaths of Veterinarians

Arthur E. French, 53, Housatonic, Mass., Chicago Veterinary College '16, employed for a number of years by the Massachusetts Department of Agriculture until retiring because of poor health about ten years ago, January 31.

John J. Riordan, 74, Beverly, Mass., American Veterinary College '94, practiced in Beverly 68 years, February 27.

W. S. Hinchcliff, 86, Murphysboro, Ill., Ontario Veterinary College, practiced in Jackson County, Ill., for 60 years, March 10.

George W. Heath, 63, Stonington, Conn., New York University '06, March 12.

J. T. Arrell, 67, Caledonia, Ont., Ontario Veterinary College '90, March 20.

J. Henry Harding, 46, Constantine, Mich., Grand Rapids Veterinary College '16, world war veteran, March 21.

William J. Tower, 24, Leonminster, Mass., Ontario Veterinary College '39, March 27.

F. W. Eaton, 82, Farragut, Ia., one of Iowa's oldest practicing veterinarians, March 28.

Lewis C. Crabb, 53, Fort Worth, Tex., Kansas City Veterinary College '11, former city, county, and state veterinarian, March 29.

Thomas J. Kinard, 72, Ninety-Six, S. C., University of South Carolina '91, director of the South Carolina Agriculture Society, March 29.

Erman C. Williamson, 49, Wells County, Ind., Indiana Veterinary College '15, March 30.

Albert J. Scott, 66, Romeo, Mich., formerly practiced at Traverse City, Mich., and Salisbury, Md., March 30.

W. R. Harley, McCune, Kans., Kansas City Veterinary College '10, April, 1941.

John Christian Schwencke, 70, Thomasville, Ga., Royal College of Veterinary Surgeons, Copenhagen, Denmark, practiced in Thomasville 42 years; member of the State Board of Veterinary Examiners 1899-1933; president of the Georgia State Veterinary Association 1909-1917 and subsequently honorary vice-president; served in the Spanish-American War, April 4.

Jacob G. Pfersick, Greenfield, Mass., McGill University '98, April 11.

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Ohio State Veterinary Conference

The Fourteenth Annual Conference of the College of Veterinary Medicine, The Ohio State University, will be held June 18, 19 and 20. This year, as formerly, the program is quite extensive, including discussions by some of the foremost veterinarians and educators in this country. The entire three-day period will be devoted to the discussion of topics of vital importance to every veterinarian. An effort has been made to arrange the program so that its quality and variety will appeal to all veterinarians.

The program this year has been formulated for the purpose of giving to the practitioner the very latest developments in veterinary medicine. It is generally conceded that such intensive short courses provide the necessary educational opportunities for the busy practitioner. This year on account of its military significance an effort has been made to include some topics of importance along this line. Those who understand the present situation will be present to discuss these topics.

These short courses are sponsored by the College of Veterinary Medicine, which believes it can render a real service to the live stock industry through the veterinary profession and an invitation is extended to all veterinarians to attend. We feel sure that much of value from an educational point of view will be offered.

Veterinary Clinic and Department of Pathology, Ohio State University

A program of the conference will be mailed on request to any veterinarian. It contains the names of many nationally known experts in specific lines, assuring an excellent and instructive program. Everything possible will be done to make attendance at this conference pleasant and profitable.

Remember the dates: June 18, 19, 20, 1941. —Oscar V. Brumley, Dean.

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This yeast, incorporated to the extent of 5% in a ration deficient in the vitamin B complex, permits rapid growth in rats.

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100 lb. drum	33.00	10,000	10.00

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5 lb. drum	8.75
10 lb. drum	16.50
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TABLETS (5 grain)

1000	$ 2.25
5000	10.25

(Tablets may be had in white, red, blue and yellow. White tablets sent on unspecified order.)

Write for special quotations on large quantities of tablets or boluses.

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Ascorbic Acid	oz.	4.00
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